THE GARDEN JOURNAL

OF THE NEW YORK BOTANICAL GARDEN

September 18, 1958 — Open meeting sponsored by New York Unit of the Herb Society of America, Assembly Room in Snuff Mill of The New York Botanical Garden; T. H. Everett will speak on "Herb Gardening."

October 18, 1958 — Children's Flower Show and Annual Chrysanthemum Arranging Competition at the Garden.

November 7, 1958 — First Day of Chrysanthemum Show in the Conservatory of The New York Botanical Garden.

December 4, 1958 — Christmas House Tour, sponsored by the Volunteer Associates of The New York Botanical Garden, of homes of U.N. missions decorated in the Christmas traditions of the respective countries.

January 8, 15, 22, 29, 1959 — Downtown Lecture Series sponsored by the Volunteer Associates of The New York Botanical Garden.

February 4, 1959 — Annual Members' Day of The New York Botanical Garden.

THE GARDEN JOURNAL
of The New York Botanical Garden

DOROTHY EBEL HANSELL
Editor

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AMONG OUR CONTRIBUTORS

ROBERTA C. (MRS. GEORGE D., JR.) WATROUS is a charter member of the American Daffodil Society, also a charter member and currently president of the Washington, D.C., Daffodil Society . . . K. W. REISCH is Assistant Professor in the Department of Horticulture and Forestry, Ohio State University . . . PAUL N. PROCOPIO is Assistant Professor, Department of Landscape Architecture, University of Massachusetts . . . FREDERIC P. LEE is a director of the American Horticultural Society and chairman of the advisory council of the U.S. National Arboretum. An amateur gardener with a particular interest in azaleas and other plants for the shady garden, he is author of THE AZALEA BOOK, published this spring by D. Van Nostrand Co. Ltd., under the sponsorship of the American Horticultural Society. Mr. Lee also edited the now out-of-print AZALEA HANDBOOK of this Society . . . JEAN HERSEY gardens in Connecticut and writes books and articles about her gardening experiences . . . DR. JOHN C. WISTER is Director of the Arthur Hoyt Scott Horticultural Foundation, author, lecturer, and one of the most esteemed men in American horticulture . . . SETH L. KELSEY is Vice-President of Kelsey-Highlands Nursery, which nursery, established in 1885, formerly carried the name of his father, the widely-known Harlan P. Kelsey . . . J. N. JOINER is Assistant Professor of Ornamental Horticulture at the University of Florida, from which he received his B.S.A. and M.S.; he is completing his Ph.D. at Ohio State. Mr. Joiner has been on the staff at the University of Florida eight years, serving six years as extension specialist. T. C. SMITH received his B.S. in Education at Tennessee Polytechnic Institute; spent a year at Columbia University studying botany, then transferred to the University of Florida from which he received in June his B.S.A. in ornamental horticulture, and is now working there on his Master's Degree . . . T. H. EVERETT is Curator of Education and Horticulturist at The New York Botanical Garden . . . PHYLLIS (MRS. ERIC A.) NOBBS is granddaughter-in-law of the Rev. John Croumbie Brown and of Mrs. Brown whose paintings illustrate Mrs. Nobbs' article in this issue of The Garden Journal . . . GERTRUDE B. FOSTER is Editor of Herb Grower Magazine . . . JOSEPH MONACHINO is Associate Custodian of the Herbarium of The New York Botanical Garden . . . H. W. RICKETT is Bibliographer of The New York Botanical Garden.

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MINIATURE DAFFODILS:

SPECIES AND GARDEN HYBRIDS

by Roberta C. Watrous

SMALL DAFFODILS have long been used in gardens, but their greatest popularity has come in recent years, while modern show and garden varieties have been steadily growing larger and taller. What is their special appeal? Not small size alone, although a yellow trumpet half an inch wide on a three-inch stem may suggest a doll's garden. The diversity in forms is equally fascinating: the classic simplicity of *Narcissus Watieri* and *N. rupicola,* the jauntiness of *N. cyclamineus* and its hybrids, the airy grace of the triandrus group, and the decided individuality of the bulbocodiums.

In addition to the varied charms of their flowers, miniature daffodils have other virtues to recommend them. By planting miniatures we may have daffodils several weeks before the larger types begin to bloom. They are especially suitable for the rock garden, of course, and may be used effectively near the front of borders or naturalized in small-scale woodland settings. The foliage of most of the small varieties is narrow and not unsightly during the ripening period. If the very small bulbs are grown in pots sunk into the ground, they may be brought into the house when in bloom, where the flowers may be enjoyed at close range, to be returned to their outdoor places when the bloom fades. The bulbs may remain in the same pots for several years. This method of planting has other advantages: drainage may be controlled more surely, and the summer baking some species need may be achieved by moving the pots to a hot dry place when the foliage has ripened.

When we speak of "miniatures" we usually have in mind varieties from two to eight or nine inches tall, with flower or flower cluster in proportion. "Flower in proportion" cannot easily be defined. Not only size of flower or cluster, but shape—as influenced by the length of trumpet and width and angle of perianth segments—and even thickness of stem and length of pedicel affect the proportions so that some seem true miniatures and others merely short-stemmed smallish flowers. Although the latter have their place in the garden and for growing in pots, this article will deal chiefly with the true miniatures.

It may seem pedantic to stress the distinction between species and garden hybrids, but there are practical reasons for doing so. We know that wild plants often prove disappointing in gardens, and wild daffodils are no exception. Most of the species are natives of mountains of the Mediterranean area; some come from limited and specialized habitats. Some are naturally short-lived, depending on seeding rather than bulb division for perpetuation. Failing the ideal conditions which will enable these short-lived species to naturalize in place by seeding, the gardener must be willing to replace the bulbs as they die out, either by growing new ones from seed or buying bulbs others have grown or collected from their wild homes. Whatever the reasons may be, hybrids and bulbs grown under cultivation seem better adapted to garden conditions than newly-collected wild bulbs.

Linnaeus recognized six species of *Narcissus* in the first edition of his SPECIES PLANTARUM. These were *N. poeticus, N. Pseudo-Narcissus* (trumpets), *N. Bulbocodium, N. serotinus, N. Jonquilla, N. Tazetta.* Although later botanists have added enormously to this list, by new discoveries and new interpretations, it is still useful as a guide to the distinct types within the genus, if we add *N. triandrus,* which Linnaeus included in the second edition and *N. cyclamineus.* Each of these groups contains small or comparatively small members; some consist chiefly or entirely of miniatures. These, then, are the wild daffodils that will appeal to those who like small things, and will provide the raw material from which garden varieties will be bred.

Until recent years only the most common of these small species were carried by the average American bulb dealer, usually *N. Bulbocodium conspicuus, N. triandrus,* and *N. cyclamineus.* A somewhat wider choice was offered by certain Dutch and English dealers, but most of the bulbs were collected wild ones rather than nursery-grown, and the mortality under garden conditions was high. About thirty years ago Alec Gray, of Cornwall, England, began collecting all available small species, cultivating them, and producing new varieties by hybridization. His exhibits at the Royal Horticultural Society, his writings, and his bulbs have been largely responsible for the present popularity enjoyed by these miniature daffodils. Now many of our dealers are offering a wider selection of the small species, a few supply bulbs grown under cultivation, rather than collected wild bulbs, and as supplies permit they are making available the newer miniature hybrids bred by Mr. Gray and others.

THE TRUMPETS

The trumpet group includes one tiny yellow species, one very small white one, and several yellows that may safely be called small. The tiny one is *N. asturiensis,* often called Minimus. The flower is only an inch long and is carried on a stem two to four inches high. It is not only the smallest but the earliest trumpet; here in Washington (D.C.) it may bloom late in February or early in March. Although its bulbs do not divide, it sets seed readily. The pure white trumpet of *N. alpestris* is an inch and a half long, and nods from a four-inch stem. Native of the Spanish Pyrenees at a height of about seven thousand feet, it seems very reluctant to accept more lowly dwelling places, and is one of the most difficult species to keep. Mr. Gray has used it to produce 'Snug,' which is said to be more amenable, but still very scarce.

Plate 6473 from *Curtis's Botanical Magazine*, v. 106, 1880: Three wild forms of *Narcissus*: a. (center) *N. triandrus pallidulus (concolor)*; b. (left) *N. bulbocodium graellsii*; c. (right) *N. rupicola*.

The somewhat larger yellow *N. minor* and *N. minor pumilus* have long been cultivated, and their bulbs increase in the conventional manner. *N. nanus* (Lobularis of the trade) is not known as a wild plant and is probably a hybrid. Its bulbs multiply very rapidly, but it is not a generous bloomer. The small flower with imbricated (overlapping) perianth segments is attractive, although the coloring, two shades of yellow, is rather dull. *N. obvallaris* is almost too large to be considered a miniature, but its perfect form and bright color make it irresistible in the garden and invaluable as a parent. From this species crossed with *N. asturiensis* has come 'Tanagra,' the favorite miniature yellow trumpet among the garden hybrids. It is about five inches tall, with good carriage, nicely serrated trumpet, and wide, beautifully flat perianth. Some other garden hybrids in the trumpet section are 'Wee Bee,' pale yellow, 'Bambi' and 'Little Beauty,' bicolors, 'Rockery Beauty,' in two shades of yellow, and 'Rockery White.' All of these are about six inches tall and of Dutch origin. In general, the trumpets are quite hardy and do well in northern gardens.

The Cyclamineus Group

Closely related to the trumpets is the little *N. cyclamineus,* whose long narrow trumpet with narrow perianth segments streaming behind suggests a descending rocket. Unlike most daffodils it grows best in damp situations and, if undisturbed, will often seed itself. This species hybridizes easily with other early-blooming daffodils, and the hybrids are usually early, long-lasting, all-yellow, with long, rather narrow trumpets. 'Mite' is a very pleasing small one, only slightly larger than its species parent, with perianth segments not quite so sharply reflexed. *N. cyclamineus* crossed with the tazetta 'Soleil d'Or' has given 'Cyclataz,' with a cluster of several yellow and orange flowers, 'Tête-à-Tête,' with solitary flowers of the same coloring, and 'Quince,' with one to three pale yellow flowers. There are other newer varieties not yet widely distributed.

The Jonquilla Group

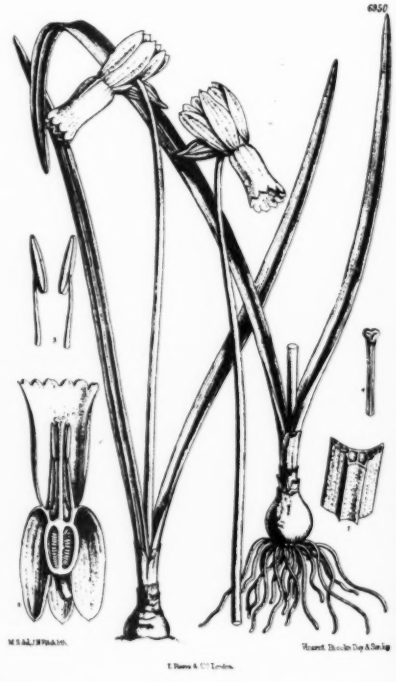
The jonquilla group consists almost entirely of species less than six inches tall, with small, rather flat flowers of very smooth texture. Among these are two newcomers from the Atlas Mountains of Morocco. *N. Watieri,* introduced into England about 1930, was instantly popular because of its beautifully-formed, sparkling white flowers. It was soon found to be a free seed-setter, and no time was lost in using it in hybridizing. 'Xit,' 'Demure,' Picarillo,' and 'Tweeny' are some of its progeny that are much in demand. In 1950 another new species was announced: *N. atlanticus,* which is similar to *N. Watieri,* but creamy rather than pure white. Except for the color, both closely resemble *N. rupicola,* having flat glaucous foliage and solitary flowers with bowl-shaped corona and spreading perianth. The flowers face upward from four-inch stems. *N. juncifolius* differs in having narrower dark green leaves, several flowers on a stem, and an intensely sweet fragrance, which the solitary species lack. *N. scaberulus* and *N. calcicola,* both very scarce, offer still more diversity in this group.

N. Jonquilla itself, long a favorite in our southern states, is too tall to be considered a miniature, although its individual flowers are small, and many of its hybrids fall within the nine-inch limit. *N. tenuior* was formerly considered a species, but is now believed to be a very old hybrid between *N. Jonquilla* and a small form of *N. poeticus.* It is a charming plant, with one to three pale flowers on a five-inch stem that is sometimes a little weak. Among the desirable newer small jonquil hybrids are 'Sun Disc,' 'Sundial,' 'Flomay,' 'Bobbysoxer,' all similar in form but ranging in color from bright yellow to creamy white. Most or all of these have *N. rupicola* as one parent, and that species seems to give good form and smooth texture to all its progeny. 'Kidling,' from *N. Jonquilla* and *N. juncifolius*, is about six inches tall and has fragrant, bright yellow flowers freely produced. 'Peaseblossom,' only four inches tall, with very small pale yellow flowers, might almost be called a miniature miniature. Members of the jonquilla group are usually happiest in warm areas, in light sandy soil and full sun.

The Triandrus Group

N. triandrus takes its name from the fact that only three of its six anthers are visible, the other three remaining hidden within the perianth tube. This group consists of a number of slightly-differing forms shading from white to deep yellow. The white *N. triandrus albus* is the most common, often known

Plate 6950 from *Curtis's Botanical Magazine*, v. 113, 1887: *N. cyclamineus.*



Left. 'April Tears' (triandrus hybrid)

Below. 'Flomay' (jonquilla hybrid)

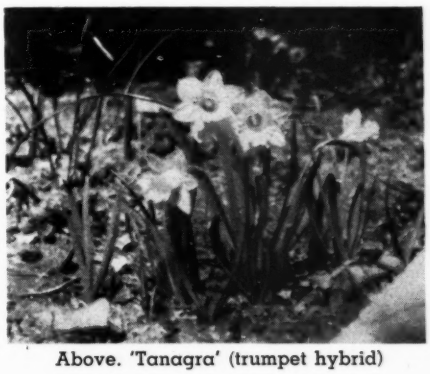
by its nickname 'Angel's Tears.' The essential qualities of the group are the refinement due to their silky texture and the gracefulness due to the combination of reflexed, slightly twisted perianth segments and loosely poised flowers, which are usually borne in clusters of two or more. The stems may vary from three to six inches or more in height. The best-known small triandrus hybrids are 'Hawera' and 'April Tears,' both having *N. Jonquilla* as the other parent. 'April Tears' has wide perianth segments, giving the flowers a symmetrical outline; 'Hawera' is softer in effect. *N. triandrus* forms crossed with small trumpets give flowers with long cups and slightly-reflexed perianths, usually of beautiful texture. 'Queen of Spain' is a wild hybrid of this parentage, pale yellow, and 'Tristesse' is a white garden hybrid.

The Bulbocodiums

Members of the bulbocodium or "hoop-petticoat" group differ from all the other types of *Narcissus* in the proportions between large, funnel-shaped cup and very small perianth segments, and in having curved stamens, placed asymmetrically. The bright yellow *N. Bulbocodium conspicuus* is well known; *N. B. obesus* and *N. B. nivalis* are smaller yellow forms. The winter-blooming white forms from North Africa, *N. B. monophyllus* and *N. B. monophyllus foliosus*, are a delight where the climate permits them to be grown outdoors; elsewhere they are suitable for culture in a cool greenhouse. The lovely pale *N. B. citrinus* is a moisture-loving species. All the bulbocodiums tend to increase freely both by bulb division and by seed. Garden hybrids include 'Nylon,' milky white and winter-blooming, which endures the winters of Washington, D. C., although not reliably hardy farther north. 'Kenellis,' a bulbocodium-triandrus hybrid, flowers over a long period, and 'Elfhorn' is valuable for its very late-blooming habit. As the foliage of the bulbocodiums comes up in the fall, winter injury may take place, but this is not necessarily fatal.

Other Species

The other types of *Narcissus* need not detain us long. *N. canaliculatus* and *N. dubius* are the miniatures in the tazetta group. The former is one of those troublesome varieties that spend their energy in increasing instead of blooming. *N. dubius* is a tender species which has contributed its beauty to 'Raindrop,' one of the most appealing of all miniature hybrids. 'Raindrop' has small white flowers with bowl-shaped cup and slightly reflexed, wide perianth segments of very heavy substance and lustrous finish. One to five flowers are borne on a five-inch stem. The other parent was *N. triandrus loiseleuri. N. serotinus* and the other autumn-flowering species are seldom seen in this country, but if available might prove of interest for greenhouse culture. One *(N. viridiflorus)* has green flowers. The two smallest *N. poeticus* varieties, *N. p. radiiflorus* and *N. p. verbanensis*, are difficult to keep in cultivation and bloom so late they are not useful in hybridizing.



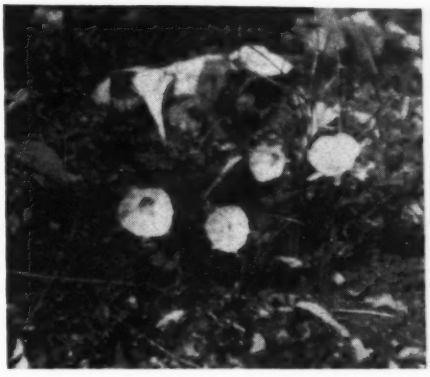
Above. 'Tanagra' (trumpet hybrid)

Right. 'Nylon' (bulbocodium hybrid)—February 22, 1954—the first year the author had it in her garden. Now 'Nylon' blooms during mild intervals from November on.

Culture

To succeed with wild plants coming from such a variety of soils and altitudes as do the various small species of *Narcissus* requires some consideration of their special needs. Generalizations are risky, but it is probable that more of the very small bulbs are lost through overfeeding than through starving. Too much nitrogen is especially conducive to basal rot, and poor drainage is fatal except for *N. cyclamineus* and certain of the bulbocodiums. On the other hand, ample moisture is necessary in the growing season. As so much of our information on the garden behavior of these bulbs comes from English sources, we need to learn how to make the best use of their experience under our varying conditions. In the meanwhile, gardeners who have been disappointed in the species will find the garden hybrids more reliable, although in many cases more difficult to obtain.

(Continued on page 153)



Pyracantha lends itself admirably to being espaliered.

VINES AND ESPALIER PLANTS

by K. W. Reisch

Based on a talk given at the Twenty-ninth Annual Short Course at Ohio State University for arborists, nurserymen, landscape gardeners and others.

ALTHOUGH THIS SUBJECT is concerned with first, a type of plant, and second, a method of training plants, the use and landscape effects are similar. In fact, vines are often used as espalier plants. Vines have been used as groundcover plants extensively; however, their use as climbers has had relatively little emphasis. This is also true of espalier plants which, although an old technique is used, are relatively new and rare in our landscapes.

These plants are becoming more important and significant in our "shrinking landscapes." Properties are smaller, gardens are restricted, the broad shrub border of a few years ago is no longer practical. The all-important factor of "space for living" is uppermost in many minds. The desirability of enclosure and privacy has led to the more extensive use of fences and walls which fulfill this need with little use of ground space. These large blank spaces in the landscape have created a separate area for consideration in the design, this area being a vertical surface. The value of vines and espalier plants in this part of the design is evident.

A number of functions can be served by plants used in this manner—to produce flowers or fruit, to reduce glare and noise, create shadow effects and interesting line effects and patterns, reduce the bareness of blank walls, screen out objectionable views, serve as a background for other plants and, in some cases, as the main feature of the design. One of the most important values of these plants is the apparent effect of height and size without the occupation of large areas of ground space.

Although both vines and espalier plants fulfill the previously mentioned functions, their practical use is different in many respects. The French word "espalier" is defined as a trellis or framework for training plants on a flat surface. We use the term to indicate the technique of training plants against a wall or other vertical surface by means of structural materials such as wires, hooks, vine guides, to which the plants are attached. In many cases, a definite pattern is followed. Vines, however, become attached to a surface by various natural means and will usually climb in a vertical direction unless trained otherwise. When vines are selected for a landscape planting, knowledge of the means of attachment is necessary. For example, some means of support must be furnished for vines which climb by twining, such as bittersweet, and for those which climb with tendrils such as porcelain vine. Vines with holdfasts, such as English ivy, or with adhesive discs, such as Japanese creeper, will become attached to any surface without any structural aid. With these types however, consideration must be given to the kind of surface, because damage may be caused to the wooden walls of a house or other building; whereas on stone, brick or concrete walls and on wooden fences there is no problem.

Consideration should also be given to the rate and extent of growth because a rank-growing vine, such as Japanese creeper, may engulf or completely cover an area; whereas the slower-growing, smaller-leaved Veitch and Low's forms of this vine give restricted coverage.

Vines are usually selected because of the ornamental effect of their flower, fruit, foliage, fall foliage, or evergreen foliage characteristics.

Among the more common vines with attractive ornamental fruits are American and Oriental bittersweet which climb by twining—their orange-yellow fruits are also used extensively for decorative purposes; porcelain vine which has unusual multi-colored fruits of blue, green, white, purple and speckled appearance; sweet autumn clematis which has showy fruits and is distinctive because of its white billowy appearance.

Flowering vines are often considered first in vine selection. Trumpet creeper 'Mme. Galen' climbs by root-like holdfasts, is rank in growth, and bears attractive trumpet-shaped ornate flowers in July. A warmer climate vine, which is growing on the Ohio State University campus, is the passion flower which bears beautiful blue to white flowers from July to September. It climbs with tendrils and requires some protection in this area. An outstanding flowering vine is the climbing hydrangea, which is a vigorous plant climbing with root-like holdfasts. The attractive white flowers, borne in June and July, add to its beauty, and the shreddy cinnamon-colored bark creates an interesting winter attraction. This vine will extend out from the wall on which it is growing, thus giving the effect of depth while occupying only a small area of ground space. The wisteria is common to everyone; my only comment is to consider the rank growth of this vine and use and maintain it carefully.

Clematis can be considered as the outstanding type of flowering vine; climbing by means of a modified leaf stalk, some form of support is necessary. Some of the fine varieties and hybrids available are the Jackman hybrids; the Ningpo hybrids, such as 'Nelly Moser,' (mauve with red bar), 'Romona' (blue), 'Lady Neville' (mauve); the scarlet clematis (red tulip-like flowers); pink anemone clematis (rose); Henry clematis (white); and sweet autumn clematis (white). Jackman, Ningpo, Henry, and pink anemone clematis are large-flowering types. An attractive fall-flowering vine is the silvervine or fleeceflower, which bears interesting billowy white flowers in August and is effective for over a month.

Deciduous vines are valued primarily

for their foliage and include parthenocissus. The Japanese or Boston ivy is a common fast-growing type, whereas the Veitch and Low's forms are slower growing and will not climb as high. The Engelman form of Virginia creeper is considered to be better than the species. When using the rank-growing forms on brick or stone building walls, frequent pruning is necessary to prevent interference with windows and doors. The fiveleaf akebia is an attractive slow-growing twining vine, which can be easily trained on a wire or similar support. Two other foliage vines, effective for heavy covers or screens, are Dutchman's pipe and Bower actinidia.

The brilliant red fall color of Japanese and Virginia creeper and their varieties can be used to good advantage in the landscape. Once established, they will persist indefinitely.

Evergreen foliage vines are a year-round asset in the landscape. Forms of wintercreeper *(Euonymus)* which climb with root-like holdfasts are used frequently by many designers. Although they are subject to scale, modern pesticides make control relatively easy. Bigleaf wintercreeper is probably the most common, the purpleleaf wintercreeper presents an interesting purple-green foliage color, and the "baby" wintercreeper has a restricted, slow form of growth. Forms of English ivy are also popular evergreen vines; however, the use of poor forms often reduces their value. Select forms which are known to be hardy and resistant to winter sun and wind burn. Recommended clones are 'Roumanian,' 'Wilson,' and 'Thorndale.'

The list of plants which can be trained in espalier fashion is virtually unlimited, but sources of plants trained specifically for landscaping use are almost non-existent. Attention should be given to adaptation to training, rate and extent of growth, degree of suckering, ornamental effects such as fruit, flower, fall foliage, and finally the pattern and textural effect desired.

Screw eyes or hooks of various types may be used to attach plants to wooden surfaces. Concrete nails are satisfactory for light material on stone or brick walls; however, hooks in a type of expansion plug are necessary for heavier plants. On either surface the use of wires, cables, or wire grids strung between hooks provides the most satisfactory means of attachment. It is easier to train branches in definite patterns, and the whole plant can be pulled away from the wall if wall repairs are necessary. Aluminum, copper, or galvanized materials are preferable.

The attachment of plant branches to the support can be easily accomplished by using cord, nylon string, or raffia. Wire should never be used because of the danger of girdling.

OUR FRONT COVER ILLUSTRATION

"A Botanist's Triumph"

"Well, sir, just let me show you this. Here's a rose I'm proud of, blooming for the first time. Due to care and patience, I've managed to give it the scent of rhubarb! I should be given a special citation in the next issue of the Journal of Useful News."

Our front cover illustration is a Daumier print, entitled *"Les Beaux Jours de la Vie,"* from the collection of the late Edwin De T. Bechtel, long a member of the Board of Managers of The New York Botanical Garden, and presented by his widow for use on the front cover of THE GARDEN JOURNAL. Mrs. Bechtel kindly translated the above caption which appears on the print but which, because of space limitations, we could not include on the cover.

At the Metropolitan Museum of Art, from June 26 to September 1, 1958, there has been an exhibit of prints by Jacques Callot and Honorè Daumier from Mr. Bechtel's collection.

The most satisfactory plants for espalier use are often so-called poor specimens. A plant with a flat side, or one which can be readily pruned to this shape, is necessary.

The plant can be trained to a geometric pattern of formal nature or shaped to an informal natural design.

Plants for espalier effect should be planted as close to the surface as possible. Top and root pruning may be necessary to permit this especially if a large root is growing on the flat side. An exception to this rule occurs when plants are used against a wooden wall, particularly in areas of high humidity. When this situation exists, the plants should be trained on a structure placed away from the wall to allow air circulation and to prevent wood rot.

The plants should initially be pruned to leave a few branches spaced in the desired fashion and to remove weak, spindly, or crossed branches. The rest of the necessary pruning can be done when the plant is attached to the support.

Established espalier plants require more or less maintenance, depending upon the particular variety; any improperly pruned or trained type will detract from the overall effect. A heavy pruning in late winter is necessary to remove unwanted branches, or to reduce the length of terminals; and on many plants successive prunings may be required during the season. Espalier training requires intensive care to assure satisfactory results, and this fact should be clear to the home owner.

The increasing interest in this type of plant material in contemporary landscaping will probably lead to greater interest among nurserymen and eventually result in more sources of supply.

MINIATURE DAFFODILS **(from page 151)**

Those who consider the less common species interesting enough to justify special study of their needs will find much useful information in Mr. Gray's MINIATURE DAFFODILS, M. J. Jefferson Brown's THE DAFFODIL, E. A. Bowles' A HANDBOOK OF NARCISSUS, and various issues of the Royal Horticultural Society's DAFFODIL AND TULIP YEAR BOOK and the Quarterly Bulletin of the Alpine Garden Society (English). Mr. Bowles' book is a necessity for anyone rash enough to attempt to follow the many confusing changes in nomenclature undergone by the genus *Narcissus* and its members at the hands of a succession of botanists, although there have been some changes even since its publication in 1934.

Finally, let me recommend hybridizing with these small species as a "do-it-yourself" venture. It is easy, can be carried on in limited space, and the results can hardly fail to be pleasing additions to the garden, whether or not they qualify as show winners or commercial successes. There is no *N. cyclamineus* x *triandrus* hybrid available now—who will be the first to produce one?

TREES, SHRUBS AND VINES
IN THE LANDSCAPE DESIGN

by **Paul N. Procopio**

Based on a talk delivered before Massachusetts Nurserymen's Association at the Waltham, Massachusetts, Field Station Short Course.

PLANT MATERIALS are, obviously, an all-important part of any landscape design. It is only with extreme difficulty that planting design can be divorced from the total design. In creating any total unified conception one must consider space, mass, form, materials and details simultaneously.

The location of individual plants and of plant beds depends upon the total concept. They will create the forms and masses which enclose the spaces we visualize when designing. Further, these plants, along with inorganic materials such as paving, walls, fences, screens, provide color and texture—the ever-changing and rich detail which provides intimate interest at human scale. It becomes immediately obvious that plants used for their own sake can easily result in a hodgepodge that may have spotty interest but not continuity or unity and will probably result in poorly conceived space.

I want to bring out a point that is obvious but important enough to mention. When working on a flat piece of paper, it becomes too easy to see relationships that cannot possibly be apparent when *walking* through the finished product. It is most important that you become capable of visualizing what you are designing. *Walk* through your design visually. Remember you are not creating only one picture with a "palette of plants." The "picture" changes: new objects, new views are forever unfolding as you walk along and change directions.

Well, how does one go about creating a planting plan? This is not easy to express in words and unquestionably each of us has a pet method. This is one method, and you can adopt what you will of it.

On the design of the total plan various spaces have been created. These spaces are bounded by various materials; plants, walls, fences, on the sides; the sky—either clear or broken by tree foliage or roof structure—for a ceiling; and for a floor, either organic groundcover or paving. By the way, note that the word "spaces" rather than the word "areas" has been used. "Space" connotes three-dimensional volume, while "area" connotes merely square footage —a term related to two-dimensions.

As the design evolves, you must determine what masses will form the enclosing sides of these spaces. Next you must work out the texture relationships; then color and season of bloom.

Finally, when you have these specifications drawn up for each group of plants, it is merely a question of placing the proper plant names on each mass. This will result in the details of the design speaking the same language as the total design.

I have broken up the possible types of plantings into three groups. These groupings are arbitrary, but they do describe the various functions of plants. The first group is called partition plantings. It includes hedges, hedgerows, boundary plantings, and the like. These plantings function similarly to the walls of a room. Where privacy or seclusion is desired, they should be above eye height. Where the feeling of openness is wanted, they should be well below eye height.

The second group is termed specimen plants. This group includes shrubs, small trees and large shade trees. A shade tree obviously can help partition by providing a canopy or ceiling. Shrubs and small trees are used much as a piece of sculpture—to provide an interesting focal point or pattern and shadow against an otherwise blank wall. These plants must have character to draw and to hold the viewer's interest. Their locations must be determined by the total concept, otherwise a division of interest will result.

The third group is the foundation planting. This refers specifically to those plants used against the house in an attempt to integrate the house with its environment—to add interest to the architecture of the house, not to draw interest to itself.

And this brings me to *Taxus* vs. *Chamaecyparis*. The designers of foundation plantings in the "twenties" are today criticized for using retinosporas which are now, and have been, pulled out because they have outgrown the house. Do you think that these small yews you are planting will always be small? And the contemporary houses are much, much lower than were the houses of the "twenties." No, my friends, you are creating maintenance problems, too.

There is a tendency, regardless of how well we know plants, to use the same plants over and over. Some of the plants I shall list are common, but some of them are not used enough.

I would not be afraid to use large shade trees on small properties. The large shade tree is a part of the heritage of New England. It is not necessarily out of scale. Proper placing can, in many instances, eliminate the dwarfing effect it might have on a small home. Among those that I put at the top of the list are: sugar maple *(Acer saccharum)*, red maple *(Acer rubrum)*, Katsura tree *(Cercidiphyllum japonicum)*, moraine locust *(Gleditsia triacanthus* 'Moraine'), Amur cork tree *(Phellodendron amurense)*, fast growing and easy to transplant, and pin oak *(Quercus palustris)*.

Of the smaller growing and flowering trees, these are worthy of mention: Japanese maple *(Acer palmatum)* and its many varieties, redbud *(Cercis canadenis)*, flowering dogwood *(Cornus florida)* and *C. florida ruba*, crabapples (*Malus* species and varieties), cherries (*Prunus serrulata* varieties), Japanese tree lilac *(Syringa amurensis japonica)*, and birch *(Betula)*.

The flowering shrubs are most underrated plants. There are many good ones, and there will be even better varieties in the next five to fifteen years, due to newer techniques in plant breeding. Some of the genera which are worthy of note are: *Amelanchier, Azalea*, now, of course, called *Rhododendron, Benzoin, Berberis*—especially *Thunbergii* and its new thornless variety, *Buddleia, Callicarpa, Chaenomeles, Chionanthus, Clethra*, and the pink variety, *Cotoneaster* — especially the low-growing types such as *horizontalis* and *apiculata, Euonymus*—deciduous forms, *Forsythia*—especially variety

(Continued on page 169)

Companion Plants for

THE SHADY AZALEA GARDEN

by **Frederic P. Lee**

Excerpts from Chapter 4 of **The Azalea Book** reprinted with permission of the author, Frederic P. Lee, the publisher, D. Van Nostrand Co. Inc., and the American Horticultural Society by whom the book is copyrighted and sponsored.

AZALEAS MAY BE GROWN in specially prepared soils in alkaline or neutral soil areas as the Midwest, southern Florida, and the southwest and central and southern California. . . . The garden where azaleas may readily be the dominant shrub, however, is an acid soil garden in the Northeast, South, or Northwest Pacific Coast. Best for them is a soil which is medium or strongly acid, between pH 4.5 and 5.5, and is a clay or sandy loam with considerable organic matter. Also to be preferred is an informal garden with some shade.

The shady azalea garden, if on an open site, will have only a few hours of direct sunlight in morning or afternoon, with shade the rest of the day; or no direct sun but day-long reflected light, such as that found on the north side of a house, hedge, or hill. The shady azalea garden, if on a woodland site, will be in a glade, or along the edge of woods, or most often in the shade that accompanies the filtered sunlight under tall deciduous trees whose branches have been trimmed high from the ground.

Companion plants for azaleas in such a garden present the problem of shade-loving or tolerant plants for an acid soil. Solution of the problem requires ingenuity and experimentation. The solution must also take account of the climatic zones to which the companion plants are adapted. It is unlikely that any companion plant would have a range as great as that of the various azalea species and hybrids in the aggregate. A successful shady, acid-soil garden, whether or not azaleas dominate it, is one hallmark of a distinguished gardener.

Background Plants

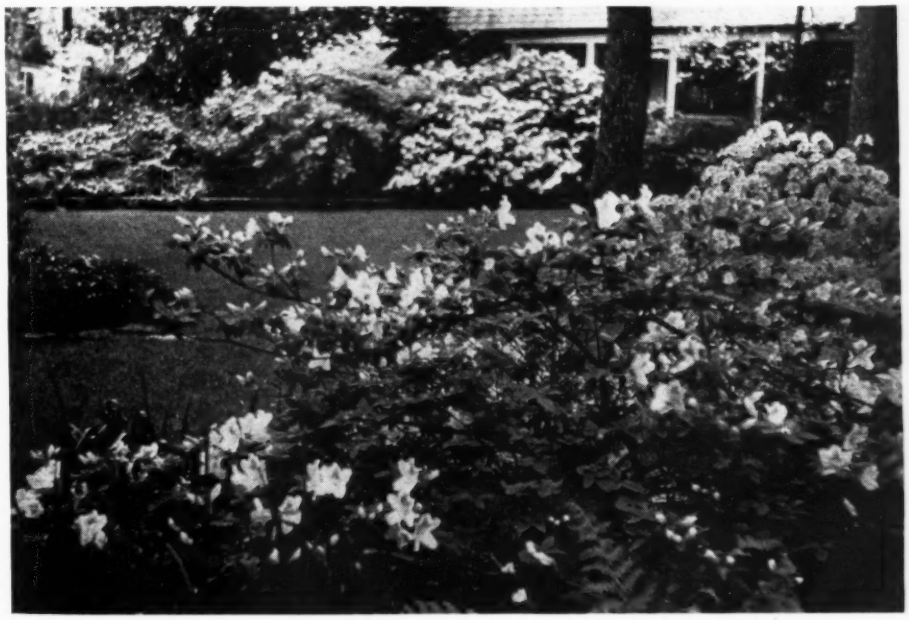
The zones here used and their average annual low temperatures will be found on page 158. Long Island and White Plains, for example, are in Zone 9.

Conifers. Among taller background associates for the shady azalea garden are certain conifers and broadleaf evergreens. The conifers, however, are restricted to the yews *(Taxus)*, particularly the Japanese yew *(T. cuspidata)* (Zone 4), and in warmer regions the English yew *(T. baccata)* (Zone 8). The typical spreading Japanese yew will grow six feet high and twelve feet wide in a dozen years. The upright form *(T. cuspidata capitata)* may be twice as high in the same period. Most forms of the hybrid yews known as *T. media* are useful. There is also the slow-growing plum yew *(Cephalotaxus Fortuni)* (Zone 9); and for the far South (Zone 12), the *Podocarpus*, as *P. Hallii, P. Nagi,* and *P. macrophylla,* the last the commonest and hardiest.

In the North, where the garden is not on a woodland site under tall, deciduous trees, the native Canadian hemlock *(Tsuga canadensis)* and Carolina hemlock *(T. carolinianum)*, some of the better firs *(Abies)* and the China fir *(Cunninghamia lanceolata)* and some of the true cedars *(Cedrus)* are attractive for screening and background; in the South, use some of the pines *(Pinus)*.

Broadleaf Evergreens. The broadleaf evergreens that make fine, tall backgrounds are usually not suited to the colder climatic zones. They include the English holly *(Ilex aquifolium)* and its numerous tall-growing varieties and forms; the Chinese holly *(I. cornuta)* and the Burford variety of this *(I. c. Burfordii);* the Japanese holly, particularly the varieties *I. crenata convexa* and *I. c. hetzi*, up to six feet; the Perny holly *(I. Pernyi);* the camellia-leaved holly *(I. altaclarensis (aquifolium) camelliaefolia)*. These are all good to Zone 9. For colder areas (Zone 7), the American holly *(I. opaca)* in one of its choicer varieties or forms may be used. In the South (Zone 10), there are the yaupon *(I. vomitoria)* which suckers badly, and the dahoon *(I. Cassine)*.

Other tall-growing broadleaf evergreens for the background are the holly osmanthus *(Osmanthus ilicifolium)* and the sweet osmanthus *(O. fragrans)*, both ten-foot shrubs with strongly scented inconspicuous flowers in fall and late summer, and the former with holly-like leaves; the Japanese aucuba *(Aucuba japonica)* an eight-foot, very dense shrub, which requires shade and includes many variegated leaf forms; and the southern magnolia *(Magnolia grandiflora)*, a large well-known tree



Azalea *mucronatum (indica alba),* Kaempferi hybrid 'Othello' and, in foreground, Kurume hybrid 'Hatsushima' grow in shade with only late afternoon sun.

Azalea Kurume hybrid 'Sherwood' grows in poolside bed with three hours' morning sun only; tulips, daffodils, tall scillas, and white epimedium are companion plants.

with beautiful foliage and waterlily-like flowers. These are all companions for the warmer areas (Zone 9 or 10).

Rhododendrons and Camellias. Of all the broadleaf evergreen shrubs suited to the azalea garden and wholly adapted to the same cultural conditions, the rhododendrons and the camellias, where hardy, are outstanding. Suitable varieties are far too numerous for listing here. Rhododendron choices must be based mainly on hardiness to cold and tolerance of intensive summer heat and dryness. In general, rhododendrons are not good in the warm climatic zones, as for instance, on the eastern coastal plain south of Washington, D.C. However, one native, *Rhododendron Chapmani,* grows in this area. In the South, rhododendrons usually need the cooler, humid conditions of the mountains or higher parts of the piedmont.

Both *Camellia Sasanqua* and *C. japonica* are suitable (Zone 10), but not in the colder climatic zones as on the eastern coastal plain north of Washington, D.C. Dr. P. W. Zimmerman of the Boyce Thompson Institute for Plant Research at Yonkers, New York, has had success with a few varieties of *Camellia japonica* even that far north.

Boxwood. This is historic in azalea and camellia gardens in the South. The common box *(Buxus sempervirens)* (Zone 8) is available from specialists in numerous tall and dwarf varieties including the well-known English box *(B. sempervirens suffruticosa)*. The littleleaf box *(B. microphylla)*, and such varieties of it as the Korean box *(B. m. koreana)*, and the Kingville dwarf box *(B. m. compacta)* are very cold hardy. In the far South, the Japanese littleleaf box *(B. m. japonica)* and the Harland box *(B. Harlandii)* do best.

Deciduous Shrubs and Small Trees. There are several small deciduous trees and large deciduous shrubs suitable for growing with azaleas. The small trees, unless planted at a distance, are likely to shade the ground too much, and they are too small to be trimmed up high. They are mainly useful as accents, and they frequently have handsome flowers. Best known of these trees are the flowering dogwood *(Cornus florida)* and its pink form *(C. f. rubra)* (Zone 6); the Chinese dogwood *(C. Kousa)* and its variety *(C. k. chinensis)*; the redbud *(Cercis canadensis)* (Zone 6), where not affected by canker, and its white form *(C. c. alba)*; and the late-summer blooming Franklin tree *(Franklinia alatamaha)* (Zone 8). The cup-and-saucer magnolia *(M. Soulangeana)* and its varieties, the Virginia and mountain stewartias (*S. Malacodendron* and *S. ovata)*, and the shadblow serviceberry *(Amelanchier canadensis)* are also effective with azaleas.

Suitable deciduous shrubs include various viburnums as the sweet-scented, five-foot *Viburnum Carlesii* and its hybrids, *V. Juddi* and *V. carlcephalum*; sweet pepperbush *(Clethra alnifolia)*, which may grow to ten feet, and its pink form *(C. a. rosea)*, the superior *C. barbinervis; Enkianthus* in variety, as *E. campanulatus* and *E. perulatus*, with small drooping bell-shaped, yellow, bronze or white flowers; the spicebush *(Benzoin aestivalis)*, seven feet tall with red berries; fothergilla with creamy yellow, bottle-brush flowers; and the white fringe tree *(Chionanthus virginica)*. All are hardy plants suitable for Zone 6 or 7.

Trillium grandiflorum with azaleas and rhododendrons flourish in high shade of woods at Winterthur, Delaware, garden of Henry F. du Pont.

Phlox divaricata, tulips, daffodils, ferns, and plantain lilies face down evergreen azaleas grown along a tanbark path in high shade of oaks and tulip-trees.

LOWER GROWING BROADLEAF EVERGREENS. These include hollies as our native ink-berry *(Ilex glabra)* (Zone 4), usually about five feet tall; the dwarf Japanese hollies *(I. crenata* 'Kingsville' and *I. c. Helleri)* (Zone 8), eighteen inches tall; and the dwarf Chinese holly *(I. cornuta rotunda)* (Zone 9), to three feet.

Others with notable flowers are the familiar mountain-laurel *(Kalmia latifolia)* (Zone 5), where it does not suffer too severely from leaf spot, usually four to five feet, although old plants can be much taller; drooping leucothoë *(Leucothoë Catesbaei)* (Zone 5), four feet, straggly, but with bronze foliage in winter and nodding lily-of-the-valley type flowers; mountain pieris *(Pieris japonica)* (Zone 7), which may grow to six feet, bronze in winter and with white spring flowers; and Formosa pieris *(P. taiwanensis)* (Zone 10), which is somewhat more tender but also more floriferous; the Oregon-grape *(Mahonia Aquifolium)* (Zone 7), three feet with dark green holly-like leaves, and the leatherleaf mahonia *(M. Bealei)* (Zone 8), taller, usually about five feet with larger leaves and interesting racemens of bluish black berries; the Fortune osmanthus *(O. Fortunei)* (Zone 10), a hybrid of the holly osmanthus and sweet osmanthus, but only up to six feet; the fragrant sarcococca *(Sarcococca ruscifolia)* (Zone 10), a four-foot shrub with fragrant fall flowers; and the David viburnum *(Viburnum Davidii)* (Zone 10), three feet with steel blue berries on the female plants. The Canby pachistima *(Pachistima Canbyi)* (Zone 7) and the western myrtle pachistima *(P. Myrsinites)* (Zone 9) are twelve- and eighteeen-inch shrubs, and Reeves Skimmia *(Skimmia Reevesiana)* (Zone 10) is a little taller. These, like the box huckleberry *(Gaylussacia brachycera)* (Zone 7), may also be used in place of groundcovers.

In a word, all of these are excellent evergreen shrubs for conditions suited to azaleas; most of them have beautiful foliage, and several have fine flowers or berries.

BULBS WITH AZALEAS

Many bulbs grow well with azaleas. Where the garden is in woodland under the high shade of deciduous trees, bulbs can complete most of their leaf growth cycle above ground while trees are out of leaf or just coming into leaf.

Daffodils *(Narcissus)*. These do as well or even better in the shaded azalea garden than in full sun. In colder climatic zones, the tazetta hybrids may not be hardy, and in the far South, you may be limited to the tazetta, jonquilla, and triandrus hybrids, and have difficulty with the trumpets, large-cupped, small-cupped, and poet daffodils, though they do become established in time. Many of the miniature species and hybrids can have a place in nooks in the azalea garden. A modern daffodil collection provides great variation in form, size, and color, and daffodils are indeed the backbone of spring bulbs for most azalea gardens. The strong yellows and oranges of daffodils damage the lavender or mallow purple azalea colors.

Squills *(Scilla)*. The dwarf Siberian squill *(S. sibirica)*, and taller English bluebell *(S. nonscripta*, syn. *nutans)* and Spanish bluebell *(S. hispanica*, syn. *campanulata)* are suitable. For the South, there is the Peruvian squill *(S. peruviana)*, the autumn-blooming Chinese squill *(S. chinensis)* hardy in Zone 9, and the hyacinth squill *(S. hyacinthoides)*, the last named being up to three feet tall. Many color forms of most of these are available in blues, purples, pinks, and white.

Snowdrops and Snowflakes *(Galanthus* and *Leucojum)*. The common snowdrop *(G. nivalis)*, the giant snowdrop *(G. Elwesii)*, the summer snowflake *(L. aestivum)*, and the spring snowflake *(L. vernum)* are among the best.

Colchicum and Sternbergia . . . the latter has winter leaves and naked fall flowers. The colchicums have large, tall-growing spring foliage and naked fall flowers. Use *C. speciosum* and its variety *Bornmuelleri; autumnale* and its variety *album;* the hybrids 'Waterlily,' 'Autumn Queen,' 'The Giant,' and 'Lilac Wonder' (floppy); and *S. lutea*. The flowers of the group are all much taller than the fall-blooming crocuses, ten to fifteen inches, and colors for the colchicums are white, pale lavender, and pink; for the sternbergia, yellow.

Arum. Large arrow-shaped winter leaves, variegated in *A. italicum*, and plain green in *A. maculatum* var. *unmaculatum*. The common Jack-in-the-pulpit *(Arisaema triphyllum)* is related, but taller with spring leaves. There are several varieties or species differing only in size and in the color of the "jack" and the "pulpit."

Glory-of-the-Snow *(Chionodoxa)*. *C. Luciliae, C. sardensis, C. gigantea*, and *C. Tmoli* are excellent with blue or blue and white flowers, low growing; also *Puschkinia scilloides*. None of these is for the South.

Crocus. The spring-blooming and fall-blooming crocuses both do well and do not require full sun as so often

stated. There are numerous named hybrid varieties in cultivation. Among the good, spring-blooming species are *C. chrysanthus, C. Imperati,* and *C. susianus*; among the fall-blooming, *C. zonatus, C. speciosus* and *C. Salzmannii.* The flowers are white, yellow, or lilac.

Lilies *(Lilium)*. The true lilies, including *Cardiocrinum* and *Notholirion,* bring summer bloom to the shady azalea garden. The lower growing azaleas afford groundcover for the taller lilies, and the dwarfer lilies do well with azaleas as a background. The disease problems of many lilies necessitate skillful gardening techniques, but well-grown lilies afford a magnificent display.

Herbaceous Perennials

Flowering perennial companions include the fall-blooming Japanese anemone in variety; the numerous graceful columbines *(Aquilegia)* with their lovely flowers; the astilbes with spikes of white, lavender, and red, and also the dwarf species *(Astilbe crispa* and *A. simplicifolia)*, and their varieties; the heucheras; the stately foxgloves *(Digitalis)* of varying heights; the forget-me-nots *(Myosotis)*; the primroses including the polyanthas, the julianas, the japonicas, and several of the species; and many of the low-growing bellflowers *(Campanula)* are all fine.

The plantain lilies (Hosta) with their unusual leafy mounds, both small and huge, fit in well as accents despite their tropical appearance . . .

Many wild flowers may also find a place in the azalea garden: the baneberries, trilliums, the western erythroniums, spring-beauty, bleeding hearts, galax, wild geranium, hepaticas, Virginia bluebells, wild phlox, Solomon's seal and false Solomon's seal, bloodroot, oconee bells, spiderwort . . . bellwort, and violets.

Most, but not all, of the native ferns like acid soil and shade, and these may, and should, find a place in the azalea garden since ferns and azaleas are a beautiful sight together.

Groundcovers

Some gardeners insist that groundcovers are injurious to azaleas. Groundcovers do interfere with the use of mulches, but certainly many azaleas can be found growing well among such sturdy groundcovers as ivy, Japanese spurge, and myrtle.

. . . Myrtle or periwinkle *(Vinca minor)* is another good, strong cover in shade. It must occasionally be pulled out of small, low-growing shrubs. There are plum-colored and white forms, as well as the more common blue; *V. major* is taller and for warmer areas. All these are evergreen. Other groundcovers are the small Himalayan sarcococca *(S. Hookeriana humilis)* (Zone 9), a shrubby plant about a foot tall with lustrous evergreen leaves; the very hardy cowberry *(Vaccinium Vitis-idaea)* and its less hardy variety *(V. V. minus)*, one-foot evergreen shrubs; and the bearberry *(Arctostaphylos Uva-ursi)*, a creeping plant to eight inches particularly good for rather sandy soils in the North.

Groundcovers for small areas in the forefront of the azalea garden are carpet bugle *(Ajuga reptans)*; Canada wild ginger *(Asarum canadense)* and related deciduous species which spread rapidly under moist conditions, have a root system difficult to eradicate, and the evergreen species, as the mottled wild ginger *(A. Shuttleworthii)* and the British Columbia wild ginger *(A. caudatum)* which spread less vigorously; the grass-like lily-turf *(Liriope)*—use *L. Muscari* which is also a good edging plant, but avoid the tenaciously spreading *L. spicata*; lily-of-the-valley *(Convallaria majalis)*; and the Allegheny foam flower *(Tiarella cordifolia)* which has white spikes and spreads. Most of these are deciduous except for the lily-turf.

Epimediums are fine edging plants, with excellent foliage. There are many good species including *Epimedium alpinum, E. grandiflorum, E. pinnatum,* and *E. youngianum* with white, yellow, and red flowers in the spring . . .

Low-Temperature Zones

Zone 1 (below —50°)
Zone 2 (—40° to —50°)
Zone 3 (—30° to —40°)
Zone 4 (—20° to —30°)
Zone 5 (—15° to —20°)
Zone 6 (—10° to —15°)
Zone 7 (— 5° to —10°)
Zone 8 (0° to — 5°)
Zone 9 (5° to 0°)
Zone 10 (10° to 5°)
Zone 11 (20° to 10°)
Zone 12 (30° to 20°)
Zone 13 (40° to 30°)

ON NATURALIZING DIANTHUS

by **Jean Hersey**

If you've ever seen them spreading their charming grey-green tones and giddy little fringed fragrant flowers through Cape Cod cemeteries, and along the roadsides, you'll know you must have them on your own acres! What a variety of dianthus are yours for the growing. Pinks, whites, mauves —fringed and tangled as to flower forms—fragrant always. These long-lasting lovely little harbingers of early summer are utterly irresistible.

So you will want them, not by the dozen but by the hundred. One hundred times anything is too expensive, so best to begin with a seed. Or even before that with a thought—with thought, and study, and a test or two! Consider the area where you'd like to naturalize dianthus. They need full sun, will hold their own in field grass if given a good start. They like light sandy soil, will thrive in poor soil if it is on the sandy side, not clay. When you have selected a possible section for your project, buy a plant or two and set them out and see what they do the next year. This we did in a part of our meadow where the black-eyed susans and daisies grow. Dianthus thrived so we started our project—and in a very cosy pleasant way. T'was a matter of a catalogue and a long winter evening. Assuming you will do the same —run through the pages and pick your varieties, any and all that appeal.

If you've a greenhouse they can be started anytime after Christmas up to June in flats of sifted rich dark soil and sand (about four to one). A few weeks later, when the seedlings have grown three or four true leaves, separate them with a small spoon to grow an inch apart in another flat. Here, making root growth, they become sturdy and by mid-May or June (being sure the last frost is behind you) set them in a small nursery outdoors. This can be an area in the vegetable or flower garden, 6 x 6 or 12 x 12 depending on the number of plants. Let the area, which must have some shade part of the day, be deeply dug and thoroughly weeded.

(Continued on page 174)

THE ARTHUR HOYT SCOTT HORTICULTURAL FOUNDATION

by John C. Wister

This is Cedar Lane Border — with Japanese flowering cherries and daffodils — at Arthur Hoyt Scott Horticultural Foundation.

THE Arthur Hoyt Scott Horticultural Foundation was established at Swarthmore College in 1929 in memory of a Swarthmore graduate who was an enthusiastic gardener. He believed gardening should have an important place in our modern industrial and highly mechanized society, and that it could do much to make our people healthier and happier. He knew the deep satisfactions that come to those who love to work with their own plants, and he wanted to encourage as many people as possible, not only to do garden work but to grow the finest possible plants.

The official purpose of the Foundation was stated as follows: "The endowment fund for the Arthur Hoyt Scott Horticultural Foundation has been given to Swarthmore College to hold in trust and to use for the encouragement of horticulture in its broadest sense. The founders have wished to make possible a dream of Mr. Scott's to help horticulture by visual demonstration. They have believed that this dream can be best realized by the planting in a public place of such trees, shrubs, and flowers as can be used by people of average means living in the Philadelphia suburban area. While they wish this planting to be of scientific value, they have no wish to duplicate the work of existing botanical gardens which already cover their field well. Rather they wish this to be a practical horticultural garden. The term 'practical' may here be defined as referring to plants hardy, without special care, in the climate of eastern Pennsylvania as constrasted with tender exotic plants which cannot be grown or enjoyed by the average person." (Bulletin of Swarthmore College, Volume XXX, No. 3, Supplement, Twelfth Month, 1932.)

Since then it has several times been emphasized that the purpose of the Foundation is not merely to beautify the College campus, but rather to call attention to the many splendid plants which can be grown outdoors in eastern Pennsylvania.

At the time the Foundation was established, Swarthmore already had a beautiful campus of over two hundred acres with fine woods and specimen trees and lawns. It did not, however, have flowering trees except for dogwoods, or many flowering shrubs. In all, there were on the property approximately two hundred and fifty species and varieties of plants, and this included the wild flowers and the common weeds.

The first report of the Director to the President of the College stated that there was not enough space for a complete arboretum, but that many horticultural collections could be planted on the open areas of the campus. It was recommended that the woodlands be treated as natural preserves by safeguarding them against fire and vandalism, and by replacing such trees, shrubs and wild flowers that were native to the area but not then present. The report also stressed that (in 1930) there were no public plantings of hardy plants of value to gardeners in the Philadelphia area. This made it necessary for those who wished to learn about cherries to go to Washington, to New York to study irises, to Rochester to see lilacs, and to the Arnold Arboretum to see more complete collections of hardy trees and shrubs. It was felt this was a reflection upon the Philadelphia area, the home of Bartram, Humphrey Marshall, the Painter Brothers, Meehan, and many other famous botanists and gardeners.

During the first ten years the Foundation planted on the campus or in the College woods about one thousand species of wild plants and nearly four thousand horticultural varieties or, as we are now told to call them, cultivars. The emphasis was on flowering trees and shrubs. Among these were magnolias, flowering cherries and apples, hawthorns, dogwoods, and forsythias, lilacs, deutzias, mock oranges, rhododendrons and azaleas. All of these now give fine displays of flowers. Many additional shrubs were chosen for their autumn color of foliage or of berry.

Only a relatively few species and varieties of magnolia were available commercially in the early thirties as imports from abroad had been practically shut off by Quarantine 37. In 1931 Liberty Hyde Bailey came to Swarthmore to see what the new Foundation was doing, and he asked what he could do to help us. I told him what I wanted most was an introduction to the Superintendent of Highland Park, Rochester, so that I could ask for cions from their magnolia collection. Dean Bailey smiled and said he would see what he could do.

A couple of weeks later a letter came from B. H. Slavin, Head of all the Rochester Parks, offering to give us any plants, cions, cuttings or seeds that we wanted. Harry Wood, the College head gardener, went at once to Roches-

ter; and although the thermometer was near zero, he cut cions of over a dozen varieties of *Magnolia Soulangeana* and turned them over to a New Jersey nurseryman to graft for us.

The Boyce Thompson Institute sent us the then very rare *Magnolia salicifolia,* Mrs. Norman Henry gave us *Magnolia cylindrica,* and Henry Hicks sent us some seedlings of *Magnolia virginiana.* One of them turned out to be evergreen, which is unusual in this climate, though common in the South. With additional kinds added through the years, we now consider our collection one of the finest in the country.

Our Japanese cherries collection was made possible by a gift from two Swarthmore graduates in Atlantic City; the plants came from the late A. E. Wohlert, at that time the foremost grower of the then new varieties.

We were lucky also to have the help of the Morton Arboretum and of A. F. den Boer of Des Moines in assembling the newer crab-apples, and Professor J. G. Jack of the Arnold Arboretum sent us seed of some twenty species of *Crataegus.*

Dogwoods, of course, are native here, but we set out many additional hundreds of plants in our woods and planted other flowering trees in smaller quantities.

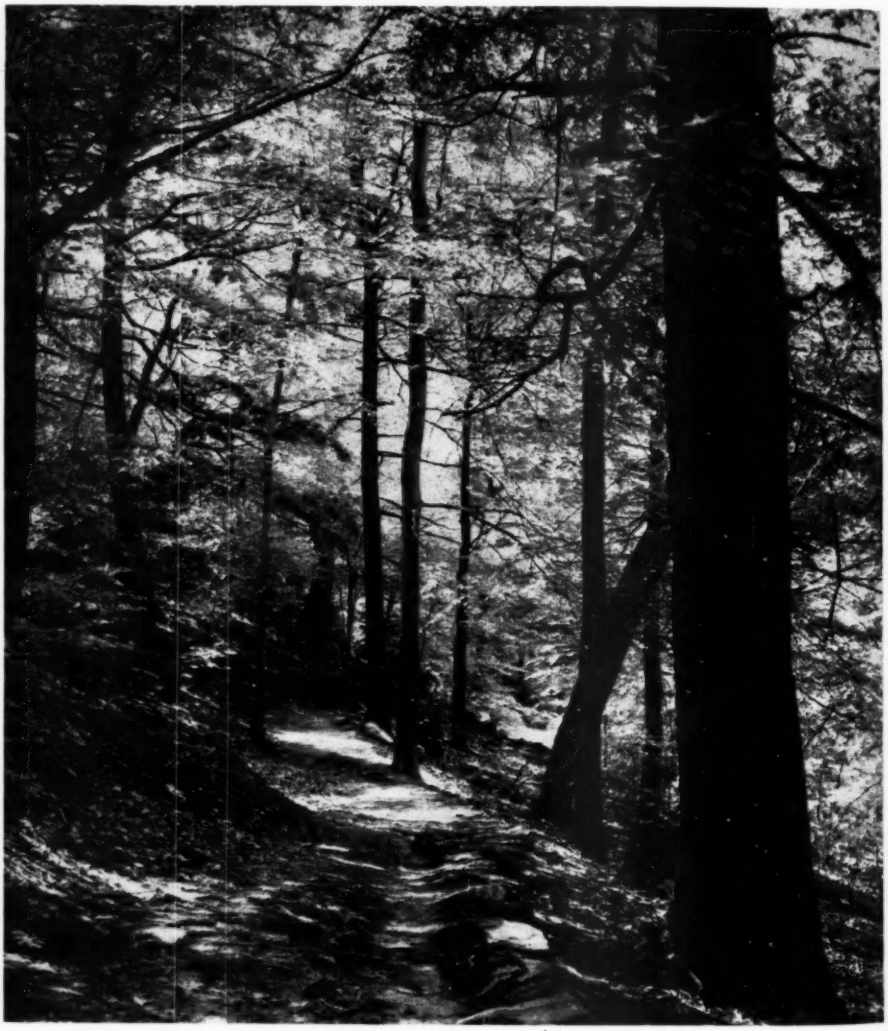
In flowering shrubs the early emphasis was on lilacs because it was Mr. Scott's favorite shrub, and Mrs. Scott could give us young suckers from her outstanding collection. We soon had well over a hundred of the very finest varieties of the common lilac. Some of Lemoine's early hybrids were brought from France. A chance reading of the exhibition of some new Canadian hybrids at a Royal Horticultural Society meeting in London led to our importing from Canada some of Dr. F. L. Skinner's dilatata hybrids. Later Miss Isabella Preston sent us from Ottawa cions of some of her late hybrids.

Other deciduous flowering shrubs are not neglected. William Judd of the Arnold Arboretum sent us some of the more unusual forsythias. The Director's garden contributed quite complete collections of the new deutzias and philadelphus. Loniceras and spiraeas were purchased from Kohankie and rarer species from Henry Hohman.

Much of the emphasis in recent years has been upon the rhododendron collection, which has been expanded from a small beginning to cover a very large area of the woodlands. We purchased the old catawbiense hybrids from Andorra Nurseries and Cottage Gardens. In 1945 we were able to secure a fine collection of the hybrids of the late C. O. Dexter of Sandwich, Massachusetts, and in 1949 and 1950 we were fortunate in getting permission to take cuttings from The New York Botanical Garden and nearly a dozen other collections of these hybrids, and to have them propagated for us by Paul Vossberg of the Westbury Rose Company. It is very gratifying to know that we have what we believe to be the finest of the New York set including the Garden's No. 67 which is now being introduced by the Westbury Rose Company under the name of 'Scintillation.' This is one of the most beautiful rhododendrons in existence and has a remarkably long season of bloom. It is very fortunate that these cuttings were secured when they were because a year or two ago the original plant of No. 67 was lost at The New York Botanical Garden in a period of flooding. If we had not been able to get the cuttings and have them rooted, the death of this splendid variety would have been a great loss to horticulture.

In 1956 two great azalea collections were planted on the border of our Pinetum. The westerly one of about four hundred plants contains among other things Knap Hill and Exbury varieties and clones of our native species selected and numbered by the late C. D. Beadle, Superintendent of the great Biltmore Estate.

The easterly bed has over five hundred plants of Glenn Dale varieties with



Epigaea repens and other native flowers flourish in the woodland of hemlocks, oaks, tulip-trees and beech. *Shortia galacifolia* seeds itself freely. Many rhododendrons, azaleas and other suitable plants have been planted in that section of the woodland nearest to the outdoor auditorium.

Avenue of swamp white oaks leads to Parrish Hall, the main building on the campus of Swarthmore College. Daffodils bloom in the spring amid a groundcover of English ivy and pachysandra; when the students return in September, there are many colchicums in flower here.

some older *Kaempferi, ledifolia* and *Kurume* types. Over half the plants gave a fine bloom this year and all should bloom in 1959 or 1960.

The late Robert Pyle, President of Conard-Pyle rose growers, was a Swarthmore graduate and for some twenty years a member of the Board of Managers. At his death he left a bequest to the College for the construction and maintenance of a rose garden to be named for Dean Bond who was in the 1890's and early 1900's the Swarthmore Dean of Women. The garden was planned by Miss Gertrude M. Smith, Assistant Director of the Scott Foundation, and was planted in the fall of 1956 and spring of 1957. It contains about nine hundred plants in over two hundred varieties, and besides the popular hybrid teas and floribundas stresses the less well-known hybrid perpetuals, rugosas, sweet briars and other old-fashioned roses.

In the early years of the Foundation, a quite complete collection of herbaceous plants was assembled in the garden of President Aydelotte, but after 1940 this was given up as the new president had young children and needed the area for a playground. Five special collections were kept and since 1940 have been greatly improved. These included the daffodils, of which over six hundred varieties are now being grown. The older varieties are to be seen in great quantities under the trees on the campus and in the meadow lands and woods. One of the great privileges, greatly enjoyed by the faculty and students alike, is permission to pick all the daffodils they want in one of the meadows. Newer varieties of daffodils are grown in a collection classified by season, type and color, so that visitors can compare the different varieties of any particular Royal Horticultural Society class.

New varieties have been brought from such growers as Wilson, Richardson and Dunlop in Ireland; Barr, Gray and Swain in England; and van Tubergen, van Waveren and Warnaar in Holland. These newer varieties, of course, excite great interest, but it takes a long time after the first enthusiasm to judge fairly if the variety on the whole is better than some older kind. Many of the modern varieties are first chosen because they win prizes on the show bench. Not enough of them are picked for their behavior under the rougher conditions of the garden, meadow or woodland. It is not at all unusual, therefore, to find that one of the most expensive and most praised varieties is discarded after ten or fifteen years, because it is not as free blooming nor as good a multiplier as one of the older kinds.

The second herbaceous plant to be chosen for specialization was the iris. The first plants came from the garden of the Director, and later the collection was augmented by gifts from the various officers and members of the American Iris Society and particularly the Presby Memorial Iris Garden in Montclair, New Jersey. The collection has been moved from time to time to different parts of the campus, and at present is in three four hundred-foot rows in the nursery and experimental section.

The first peonies came from the garden of James Boyd, former president of both the American Peony Society and of the Pennsylvania Horticultural Society. Later many of the finest new hybrids of Professor Saunders and others were added to those of the European breeders and early American breeders. The early-flowering section of the herbaceous peony is particularly strong. It has attracted the most attention, as these varieties are as yet little known. The tree peonies have also been quite famous, but this last year, owing to the construction of a new dormitory, it was, unfortunately, necessary to move them, and a number of fine varieties were lost in the process.

The hemerocallis collection is somewhat newer, and at present consists of about one hundred and fifty varieties. They are planted, as are the varieties of daffodils, irises and peonies, by season and by color.

The chrysanthemum display garden which was started in 1932 came from the wonderful collection of The New York Botanical Garden through the kindness of its officials. In the 1930's this was one of the finest collections in the country. Unfortunately, nearly all the plants were lost in the war period. Since then the collection has not been so outstanding, and some cynically minded members of the National Chrysanthemum Society have suggested that the newer varieties are not up to the old ones. Those who defend the newer varieties believe that this criticism is based on nostalgia rather than upon accurate records. Owing to the shortage of skilled gardeners and of ordinary laborers, it has been harder and harder to keep the chrysanthemum col-

(Continued on page 169)

GROUNDCOVER PLANTS

by **Seth L. Kelsey**

Based on the talk delivered at the Third annual Short Course of the Massachusetts Nurserymen's Association.

FOR THIS DISCUSSION we are limiting ourselves to plants that can be used to provide a more or less solid cover for the ground and that can be maintained at heights not exceeding two feet.

USES OF GROUNDCOVER IN LANDSCAPING—

where grass cannot be used successfully or maintained easily, that is, on shady areas, steep slopes. Grass is the finest of all groundcovers and the only one that will stand up under any considerable amount of traffic. Other groundcovers must be used where other effects are desired, or where maintenance of grass becomes too difficult or expensive;

to permit wider spacing of the larger plants in the landscape. Desire for immediate effect, or lack of knowledge as to the eventual size and shape of plants, frequently leads to overcrowding. Liberal use of carefully chosen groundcover plants allows for a rich and satisfactory finished effect with proper spacing of the larger plants;

to preserve moisture, keep the soil friable, and help to keep the roots of the larger plants cool. To use groundcovers for this purpose is to follow the teachings of Nature, where bare ground is found only under extreme desert or arctic conditions or where solid rock makes vegeation impossible. Elsewhere one always finds some sort of groundcover, even if only of leaves or pine needles;

for sterile and rocky areas. In such locations where complete rebuilding of new topsoil would be very expensive, some of the more rampant groundcovers can be planted in carefully prepared but widely spaced planting pockets, thereby providing an attractive and permanent cover at lowest possible cost;

for planting with spring bulbs. Many bulbs will actually do better interplanted with selected groundcovers. In this way all-season attractiveness can be provided in areas where bulbs are used;

to add interest and variety to the landscape. Groundcovers furnish added contrasts in size, habit of growth and texture, thus making a more attractive picture;

to prevent erosion on steep banks and slopes. Many groundcovers, especially those spreading by underground roots or stolons, can be used in such locations to protect against erosion and at the same time make such areas attractive parts of the landscape picture;

for reduced maintenance of large areas, especially in the functional planting of highways, parks and other public places. Careful studies have shown that while grassing these areas may be less expensive initially, the use of groundcovers results in tremendous savings in maintenance costs, making the eventual cost to the taxpayer or owner very much lower;

for weed control, especially in the home landscape. Bare ground is an invitation to weeds. Carefully selected groundcovers when well established will largely prevent the germination of the weed seeds that are almost always present, but which need sun to germinate;

for the intrinsic beauty of the groundcovers themselves, in their flowers, foliage, fruit, autumn color, texture or a combination of one or more of these. Such beautiful but unobtrusive features may not appeal to those who admire only huge flowers or brilliant colors. The more discriminating gardener will find in the groundcovers a wealth of more detailed beauty to enjoy.

A SELECTION OF THE BETTER VARIETIES FOR NEW ENGLAND.

Such a selection is necessarily a matter of opinion. It is safe to say, however, that among the plants listed can be found kinds that will serve almost every groundcover purpose, and most of them are useful in other parts of the country as well. Soil acidity or alkilinity, while it must sometimes be considered, does not seem as important with most groundcovers as does the organic content and food resources of the soil. Most of these plants are quite tolerant in their likes and dislikes.

*Starred varieties indicate those especially recommended for their exceptional beauty or all-round usefulness. P—prostrate or trailing; S—less than one foot tall; M—one to two feet tall; Su—for sunny locations; Sh—for shady locations; A—doing well on acid soils; L—doing well on limestone soils.

Only a limited number of evergreens can be considered generally useful as groundcovers. Undoubtedly the future will bring us more evergreens for this purpose in low or prostrate forms of *Taxus, Tsuga, Picea* and others. Careful selection of the best low forms of *Pinus Mugo Mughus* offers promise.

**Juniperus chinensis Sargentii,* Sargent juniper. P-Su-A. An excellent groundcover, with steel blue foliage making a solid mat. Fine for seashore; and does well even in partial shade.

Juniperus conferta, shore juniper. P-Su-A. Does well in poor soils, even thriving on sand dunes near the ocean.

Juniperus horizontalis, creeping juniper. P-Su-A. Native from Nova Scotia to New Jersey. The type has bright green foliage. There are many good varieties among which the following are best known: *Douglasii,* trailing, steel blue foliage; *glauca,* blue foliage, not quite as prostrate as preceding; *plumosa,* feathery light green foliage, purplish in winter, taller growing than the others; *procumbens,* dwarfest of all.

Juniperus Sabina tamariscifolia, tamarix juniper. M-Su-A-L. Light green foliage, ascending branches. One of the few junipers to do well on limestone soils. Susceptible to red spider.

Pinus Mugo pumilio, shrubby Swiss mountain pine. S to M-Su. Lowest form of Mugho pine. Scale can be a nuisance.

Taxus canadensis, Canada yew. M-Sh-A. For shady or semi-shady woodsy areas in the northern part of our area; best when sheared every second or third year.

Taxus baccata procumbens, prostrate English yew. S-Su-Sh-A-L. Lowest of the English yew, with dark green foliage. Not reliably hardy in the northern part of our area.

Many of the most useful and beautiful groundcovers are found among the broadleaf evergreens.

**Arctostaphylos Uva-Ursi,* bearberry. P-Su-Sh-A. A very fine trailing plant, with pink flowers in June,

red berries July-October, and red autumn color when in sun. Does well only in poor soils; fine for seashore. Use only pot-grown plants.

Calluna vulgaris, Scotch heather. S to M-S-A. More than fifty hardy varieties known. Does well in light soils, helped by occasional pruning in early spring. Partial shade seems helpful in some locations.

Cotoneaster adpressa, creeping cotoneaster. M-Su. Of interesting irregular growth, it has the largest red berries of the low varieties.

Contoneaster Dammeri, bearberry cotoneaster. P-Su. Fine trailing species from central China. White flowers followed by bright red berries in fall.

**Cotoneaster horizontalis*, rock cotoneaster. M-Su. Flat horizontal branches, pink flowers in June, red berries, and reddish autumn color.

Cotoneaster microphylla, rockspray cotoneaster. M-Su. Smallest leaves of all, arching branches, white flowers, red berries. Fine on ledge or slope.

Cytisus albus, Portuguese broom. S-Su. Growing only twelve inches tall, this is the only hardy white-flowering broom.

Cytisus kewensis, Kew broom. S-Su. The lowest broom, making a mat five to six feet across and only six inches high. Sulphur-yellow flowers in May. Probably not reliably hardy except on Cape Cod and coastal Connecticut and Rhode Island.

Cytisus purpureus, purple broom. M-Su. About eighteen inches tall, unique purple flowers, beautiful in mass plantings.

Daphne Cneorum, rose daphne. S-Su-A-L. Fragrant pink flowers in spring and again in the fall. Likes cool, moist, well-drained soil. Temperamental, doing well for some and poorly for others. Prune heavily if it becomes leggy.

Erica carnea, spring heath. S-Su-A. For limited areas. Bright green needle-like foliage, rosy red flowers in earliest spring.

Euonymus Fortunei, wintercreeper euonymus. M-Su-Sh. This is not as good as some of the varieties. All euonymus are rich feeders, all are subject to scale. The following are perhaps the most useful as groundcovers: *Carrierei*, having shiny leaves, one of the best fruiting forms; * *coloratus*, very fine, with purple-red foliage in fall and winter, stem-rooting; *minimus*, this and *kewensis* are both tiny-leaved forms, compact and slow growing; * *radicans*, one of the best for general use; *vegetus*, with thick round leaves, good fruiting form, useful only in larger areas, tendency to be more shrubby than desirable in a groundcover.

* *Galax aphylla*, galax. S-Su-Sh-A. Really an evergreen herb. Slender white flower spikes in May, heart-shaped foliage red in fall and winter in sunny locations. Excellent for use with rhododendrons, azaleas.

Gaultheria procumbens, wintergreen. P-Su-Sh-A. For naturalistic or woodland plantings. White flowers, red fruit, aromatic foliage. Must not be allowed to get dry.

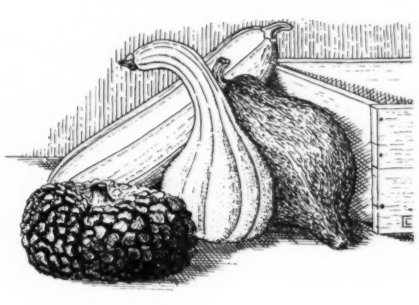
**Gaylussacia brachycera*, box huckleberry. S-Su-Sh-A. Rare native species, white or pink flowers followed by blue fruit in August.

**Hedera Helix*, English ivy. P-Sh. One of the best, requiring rich moist soil and at least partial shade for best results. There are many varieties, one of the most useful in our area is *baltica*, hardier than the species and with smaller leaves.

Helianthemum nummularium, sunrose. S-Su-L. Leaves silvery underneath, flowers yellow, pink, white or red in the more than fifty different varieties known. Likes limestone soil in full sun and a cover of evergreen boughs for protection in the later winter months.

Iberis sempervirens, evergreen candytuft. S-Su. Flat white flower clusters and evergreen foliage forming a dense mat make this useful in full sun and where it will not dry out. Better as a groundcover than its many more dwarf varieties.

Mahonia repens, creeping mahonia. S-Su-Sh. Yellow flowers in May, dull bluish green foliage, black grape-like fruit. Vigorous growth, spreading by underground roots.



Mitchella repens, partridgeberry. S-Sh-A. In partial shade and in moist acid soil this makes a delightful evergreen mat with white flowers followed by red berries. For planting in the wild garden or in open woodlands.

**Pachistima Canbyi*, Canby pachistima. S-Su-Sh. A most useful plant with tiny evergreen leaves, bronze in winter. Spreads by underground stolons.

**Pachysandra terminalis*, Japanese pachysandra. S-Su-Sh. Perhaps the most common groundcover for shady places where it makes a solid uniform cover, but does well in sun if the soil is rich, moist and has high humus content.

Potentilla tridentata, wineleaf cinquefoil. P-Su-A. One of the few to thrive in dry soil in full sun. White flowers in May, wine-red autumn color.

**Shortia galacifolia*, oconee-bells. S-Sh-A. For rich, moist soils in shady locations this is a gem. Nodding white bell-shaped flowers in earliest spring, leaves green tinged with bronze, shiny.

Teucrium Chamaedrys, chamaedrys germander. S-Su. Rose-colored flowers in summer, small glossy dark green leaves. Occasional shearing is helpful.

**Vaccinium Vitis-idaea majus*, shore cowberry. S-Su-Sh-A. White or pink flowers in May, red fruit in August-October. Forms a dense cover rarely over eight inches tall. Excellent for seashore.

Vaccinium Vitis-idaea minus, mountain cowberry. S-Su-Sh-A. Deeper color flowers, fruit dark red; similar to above but smaller in scale. Very hardy, native on highest New England mountain tops.

**Vinca minor*, common periwinkle. P-Su-Sh. A standard groundcover, with lilac-blue flowers in April, trailing stems rooting readily. Fine for holding steep slopes and for planting with bulbs. There are several varieties, among which are: *alba*, not quite as vigorous, with white flowers, fine interplanted with the other varieties; *atropurpurea*, with purple flowers; *Bowles Variety, strong

(Continued on page 173)

The Tropical Fancy-Leaved Caladium

by **J. N. Joiner and T. C. Smith**

THE BRILLIANTLY-HUED, tropical caladium is now in its peak of color in homes and summer gardens throughout the United States. Native to the Amazon basin region of Brazil, this popular member of the Araceae family produces a kaleidoscope of color to brighten both the landscape and home interior.

Caladiums were first collected from their native habitat in 1857 by two Frenchmen, Baraquin and Petit, who sent them to Europe for culture, propagation and sale. This importation soon caught the eye of many European horticultural fanciers, and hybridization for more brilliant colors became the fashion. The first famous hybrid, 'Triomphe de l'Exposition,' was developed by Louis Van Houtte and Alfred Bleu and exhibited at the World's Fair in Paris in 1867.

The late Dr. Henry Nehrling, former custodian of the Milwaukee Museum and a noted ornithologist, is believed to be the first individual to import caladiums into this country around the turn of the century. By 1910, Dr. Nehrling, who had settled in Orange County, Florida, had a named collection of over two thousand varieties and was shipping from one hundred thousand to one hundred and fifty thousand tubers annually.

Most of the currently cultivated forms of caladiums descend from the species *Caladium bicolor* and, to a less extent, from *C. picturatum*. *C. bicolor* has broader and more rounded leaves than the less common *C. picturatum*. Caladium leaves are spotted, blotched and variegated and come in various shades and combinations of white, gray, green, red, rose, yellow and bronze.

Sebring, in Highlands County, Florida, is now considered the "Caladium Capital" of the world with more than three hundred acres devoted to the production of approximately twenty million tubers annually. The mild, semi-tropical climate of the area is almost ideally suited to the production of this crop. Another three to four million tubers are produced in other areas of the state, and there is some commercial production in California.

Caladiums are true tubers—as is the Irish potato—and thus contain "eyes" or stem buds around the top and sides. The tuber can be cut into as many sections as there are "eyes" and each section planted for the production of a new plant and tuber. It is customary, however, to leave at least two eyes on each piece. For the production of seed, the caladium must be hand pollinated. Being an aroid, the spadix of the flower contains both staminate and pistillate flower parts, and only after the stamens have dehisced their pollen are the pistils receptive, and thus natural self-pollination is prevented. Pollination can be accomplished by cutting away the spathe of a receptive flower and applying pollen previously collected from the stamen. Pollen is applied to the pistillate inflorescence with a small brush and after completion of this operation, the entire spadix should be sacked to prevent further undesirable pollination. Since seedlings are not true to parental type, choice varieties are seldom propagated in this manner.

In commercial production areas of Florida, tuber sections are planted in acid, muck soil at six to eight-inch spacings in rows eighteen to twenty-four inches apart. Planting depth is usually three to four inches. Planting time runs from the latter part of February through May, and harvest usually begins in November.

After harvesting, the tubers are dried in open sheds or sheds with forced-air drafts. For drying or curing, the tubers are placed one layer thick on slatted or wire-bottomed trays for about five to six weeks. After curing, tubers are placed three to five layers deep in the slatted or wire-bottomed trays and placed in open bins until sold or until the next planting season.

Since the plant is semi-tropical to tropical in nature, the storage temperature should never be allowed to drop below 60° F. Commercial growers grade according to standard sizes for sale. The four classifications used include: Mammoth, 3½" or larger in diameter, jumbo, 2½-3½", No. 1, 1½-2½" and No. 2, 1-1½". Usually, only the larger three sizes are offered for sale. Some of the most colorful varieties produce very small tubers and are passing from the trade for this reason.

Tubers for forcing in amateur and commercial greenhouses can be obtained from about mid-December on. There is little known about the dormancy requirements of the caladium, but tubers forced in January usually take six to eight weeks to produce a saleable plant, whereas those forced beginning in May take only four to six weeks. Actually caladium tubers can be taken up anytime, dried for two or three weeks and then be repotted.

The tubers can be forced in flats until the roots are two to three inches in length and transferred to pots, or they can be planted directly into pots. The preferred forcing temperature varies between 80° to 90° F. A satisfactory potting mixture can be made using fifty percent sandy soil and fifty percent organic soil by volume. After the plant begins to grow one teaspoonful of a complete fertilizer, such as a 6-6-6, per five-inch pot every six weeks should be sufficient for good growth.

Under most forcing conditions the central or apical eye of the tuber breaks first, resulting in the production of a few leaves with other shoots developing later. More even breaking of all eyes for more uniform leaf size can be encouraged by removing the central eye prior to forcing or by cutting the tuber into three or four pieces and placing these "back-to-back" in the pot.

Caladiums are best grown in partial shade, although commercially they are produced in open fields. Best color development, however, develops when grown in approximately fifty percent full sunlight. Varieties predominantly red, do well in high amounts of sun, whereas pinks and whites apparently prefer more shade. Minimum night temperature should not fall below 65° F. Caladiums thrive best in acid soils in a pH range of 4.5 to 6.0 but will grow satisfactorily at a higher pH. They can be grown outside during the summer in any area of the country that has a growing season of at least four months. In the more northern areas

Caladiums are excellent plants for decorative use within the home.

where the summer growing season is shorter, tubers must be started inside and planted out as soon as temperatures permit.

If proper cultivation practices are followed, few troubles should be experienced with fancy-leaved caladiums. Burning of the foliage frequently occurs as a result of water deficiency or exposure to high light intensities. Low temperatures and insufficient water will prevent the tubers from starting growth, and tuber rot usually occurs when temperatures fall below 50° F.

Of the few insect pests which attack caladiums, thrips and aphids are the most troublesome, although both are readily controlled with malathion and DDT sprays. Nematodes are sometimes bothersome, but due to the rapid growth habit of the caladium, the plants will outgrow the infestation unless grown year after year in the same location; hence no serious problem is encountered with these small eel worms. Sclerotium, a fungus disease, spreads rapidly and control is difficult. Crop rotation or soil sterilization will eliminate this problem.

Caladiums are ideal outside in the border or in beds where bright splashes of color are desirable. They make excellent plants for window boxes, wall benches, around a pool or even temporarily for decorative purposes within the house. Unless the house is unusually bright, however, caladiums will soon become leggy and will lose some of their spectacular color if left inside too long.

There are more than twenty-eight hundred varieties in the trade today. Demands for different colors vary considerably with locality and season of the year. The following list of varieties, some with brief descriptions, are among the most popular and best commercial caladiums currently grown.

Whites: 'Candidum,' snow-white leaves with a narrow, dark green border and dark green, netted veins. 'Marie Moir,' large snow-white leaves with green border and ribs, blood-red blotches scattered over leaf between ribs. Additional whites include 'Aaron,' 'White Princess,' 'Sea Gull,' 'Edith Meade,' 'Royal White,' 'D. McArthur,' and 'Silver Cloud.'

Reds: 'Poecile Anglais,' leaves are a waxy deep crimson edged in metallic green. 'Scarlet Pimpernelle,' large leaves, scarlet center with a straw-colored margin, very striking and perhaps the best of the reds. 'Triomphe de l'Exposition,' 'Red Glory,' 'Red Flare,' 'Red Ensign,' 'Red Polka,' 'Rising Sun,' 'Spangled Banner,' 'Thomas Tomlinson,' 'Crimson Wave,' 'Ace of Hearts,' 'Hortiliana,' 'Brilliantismo,' 'Dr. T. L. Meade,' 'John Peed,' 'O. V. Zangen,' 'Duke,' 'Buck,' and 'Stoplight' are other outstanding red varieties.

Pinks: 'Lord Derby,' transparent rose leaf, dark green border, ribs and veins. 'Renconcavo,' delicate rose center with carmine ribs. Among other well-known pinks are 'Arno Nehrling,' 'Mrs. W. B. Holdeman,' 'Avalon Rose,' 'Pink Beauty,' 'Pink Cloud,' 'Sorocaba,' 'Apple Blossom,' 'Pink Hortiliana,' 'Itacapus,' 'Lord Rosenberry,' 'Oneca,' 'Gail Dee,' 'Miss Boo,' 'Bill Holmes,' 'Fred Bause,' 'C. W. Codwise,' 'Dr. Groover,' 'Fanny Munson,' 'Mrs. F. Sander,' and 'Miss Chicago.'

Multi-colored: 'Crescent Queen,' 'Texas Wonder,' 'Sacred Heart,' 'Autumn Beauty,' 'Mary Queen of Scots,' 'Attala,' 'Freckles,' 'Festavia,' 'Vivian Lee,' 'Elizabeth Dixon,' 'Blanche Wise,' 'Mable Barnes,' 'Susan,' 'Richard Dechard,' 'Jesse Thayer,' 'Mm. Shuman,' and 'Gireaud.'

Here caladiums are effectively combined with other foliage material in a corner plant bench.

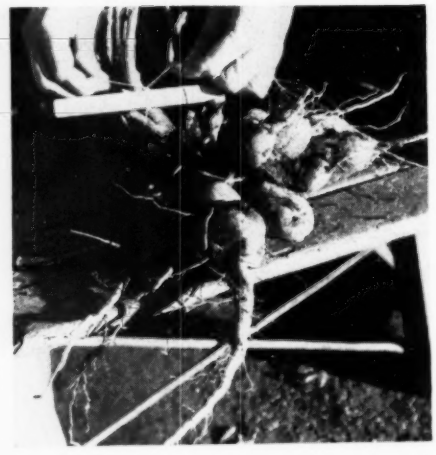
SOME REMINDERS OF FALL WORK

by T. H. Everett

1. After the first frost dahlia stems are cut off a few inches above the ground.

2. The roots are then carefully dug up with a garden fork.

3. Care is taken not to damage the roots when lifting them.



4. Each clump of roots is carefully and securely labeled before drying in the sun for a few hours and storing.

5. The corms (bulbs) of gladioli may be stored over winter by suspending them in ventilated bags in a cool, frost-proof cellar.

FALL, like spring, brings many satisfactions to the true gardener. It is a season of realization and of promise, of harvest and of planting. Many garden tasks need attention during this evening of the year. Fortunately, most can be accomplished under pleasant weather conditions and with somewhat less urgency than is necessary with much spring work.

In fall the rate of growth of plants is waning rather than waxing and, busy with his many chores, the gardener well knows that the near future holds promise of a winter's rest rather than a summer of active work. Gardeners find time, I think, to be more contemplative in fall than in spring, to appraise more rightly the results of past efforts, to look more realistically to the future.

Fall and harvest time are largely synonymous in the popular mind. In addition to fruits and vegetables the gardener must harvest many other items —his dahlia roots and gladiolus corms, his tuberoses, caladiums, tigridias, tuberous begonias and other summer

6. Cleaning perennial borders and other parts of the garden of dead foliage and other debris is an important fall task.

7. Early fall is an excellent time to lift, divide and replant most perennials.

8. Large clumps of perennials can be divided by inserting two forks, back to back, and pushing the handles apart.

9. A knife may be used to split perennials into small divisions suitable for replanting.

10. A clump of stachys divided and ready for replanting. A generous amount of roots should be part of each division.

11. Immature flowers of spring-flowering bulbs are present in the bulbs the previous fall as can be seen in this sectioned hyacinth bulb.

14. To protect tulips, crocuses and other bulbs likely to be eaten by rodents from damage the bed may be lined with wire mesh.

15. Baskets of wire mesh sunk in the ground afford protection from rodents to bulbs planted in them.

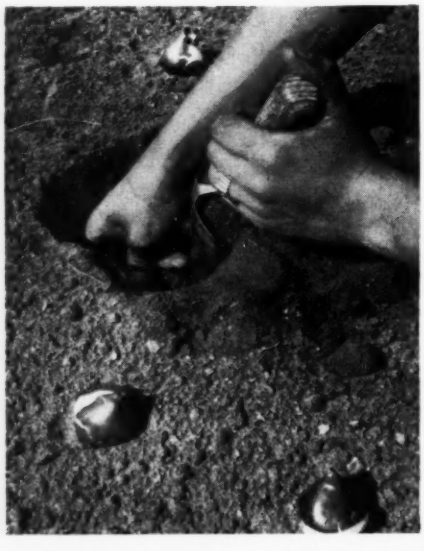
12. Tulips should not be planted as early as most bulbs. Here the bulbs are being spaced preparatory to planting.

"bulbs," his stocks of such tender perennials as geraniums, lantanas, fuchsias, impatiens, heliotropes and ageratums. It is important that all this be done with proper regard for keeping adequate records of the names of each variety. Good labeling practices are essential.

Before the advent of frost the gardener must bring under cover tender plants that have summered outdoors and are designed to brighten his greenhouse and home in the months to come, chrysanthemums, stevias and tender buddleias, cymbidiums and amaryllis, perhaps, as well as a variety of house plants.

Cuttings must be taken of tender plants that are to be preserved and grown on through the winter as young specimens to replace next year those that served their purpose in this year's summer garden. Here belong coleus, iresines, geraniums, fuchsias, heliotropes and choice varieties of verbenas and ageratums.

Many plants that remain outdoors or in coldframes over winter need special protection. Slightly tender biennials, such as English wallflowers, English daisies and canterbury bells, as well as newly-rooted cuttings that have not well-established root systems, are



13. Tulip bulbs should be planted five to six inches below the surface in deeply prepared soil.

16. Most bulbs should be set out as early as they can be obtained in fall. Here, grape hyacinths are being planted while fall-flowering sternbergias are in full bloom.

17. When their seasonal usefulness is through all tools should be carefully cleaned, oiled and stored away.

18. Garden machinery of all kinds should be cleaned, oiled and put into good working condition before being stored.

19. When severe weather comes, mats of burlap, reeds or other insulating materials are needed to protect slightly tender plants in cold frames. These should be readied in advance.

examples of these. Just before the ground freezes, soil is hilled around roses. After the ground has frozen, light coverings of salt hay, branches of evergreens or other suitable protectants may be placed over perennials to prevent damage to their roots by heaving during winter. Mats to place over coldframes in severe weather should be readied for use well before they are needed.

A general clean-up of the garden is in order in fall. Removal of dead foliage from perennials and from the annual and vegetable plots, the raking and composting of fallen leaves, the final elimination of weeds are all tasks to do. Planting trees, shrubs and perennials, lifting, dividing and replanting perennials that need such attention and the planting of many kinds of bulbs are important fall chores.

It is important to get most bulbs that are planted in the fall into the ground as soon as possible. Many, such as eranthis and anemones, suffer severely if they are permitted to shrivel even slightly before they are planted, and even such kinds as snowdrops and narcissi prosper better when they are planted early than late. Tulips are an exception. There is no advantage to be had from planting them earlier than the first week in November in the vicinity of New York City. In harsher climates earlier freezing of the ground makes somewhat earlier planting of tulips necessary. In locations where rodents are likely to disturb and eat the bulbs of crocuses, tulips and some other kinds special precautions must be taken. The most effective method is to plant the bulbs in baskets made of hardware cloth (a type of fine-mesh wire netting) or to line the beds with this material to deny the animals access to the bulbs.

Heavy soils that are vacant of crops are greatly benefited by turning them over with a spade or plow in the fall and leaving them exposed in a rough (not finely broken) condition, to benefit from the ameliorating effects of the winter frosts. This practice overcomes the puddling effect on clays that may have occurred as a result of working them or walking on them during wet weather. It is especially helpful following the compaction of soil resulting from building operations in which heavy modern equipment, such as trucks, bulldozers, concrete mixers and the like, have been employed.

A late fall task of every gardener is to clean, oil and put into condition for winter storage all tools and garden implements as soon as their seasonal usefulness is through. When this has been completed, he can with some sense of achievement relax and await the coming of the next spring catalogs.

SCOTT FOUNDATION (from page 161)

lection up to par and much of it has now been abandoned.

Many of the officers and members of The New York Botanical Garden have visited Swarthmore at various times and have seen our collections. It is hoped that this brief account will be of interest to them and that some day the Garden will conduct one of its special pilgrimages to see some of our spring flowers.

TREES, SHRUBS, VINES (from page 154)

'Beatrix Farrand,' *Hamamelis, Kerria* — mainly the single-flowered form, *Kolkwitzia, Philadelphus, Pyracantha, Syringa,* especially the French hybrids, *Vaccinium,* and *Viburnum.*

Among the better vines are: *Ampelopsis, Clematis* in its species and varieties, *Hydrangea petiolaris, Lonicera japonica Halliana, Parthenocissus* and *Wisteria.*

Finally, I want to mention books which will aid you in small property design and planting design:

Bottomley, M. E. NEW DESIGNS FOR SMALL PROPERTIES. Macmillan Co., New York, 1948.

Bushey, Donald. A GUIDE TO HOME LANDSCAPING. McGraw-Hill Book Co., New York. 1956.

Dustan, Alice L. LANDSCAPING YOUR OWN HOME. Macmillan Co., New York. 1955.

Eckbo, Garrett. THE ART OF HOME LANDSCAPING. F. W. Dodge Co., New York. 1956.

Korbobo, Raymond. COMPLETE HOME LANDSCAPING AND GARDEN GUIDE. Raymond Korbobo, Middlesex Borough, N. J. 1954 (reissued 1956).

SUNSET IDEAS FOR LANDSCAPING YOUR HOME. Lane Publishing Co., Menlo Park, Cal. 1951.

Robinson, Florence Bell. PLANTING DESIGN. Whittlesey House, New York. 1940.

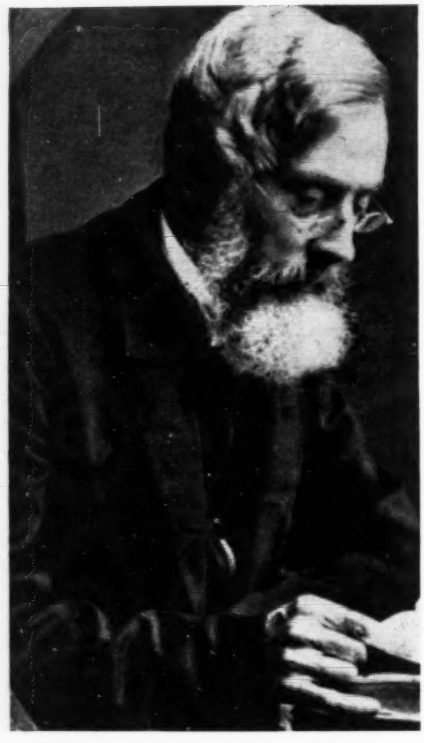
Hottes, A. C. THE BOOK OF TREES. A. T. DeLaMare Co., Inc., New York. 1952.

Hottes, A. C. THE BOOK OF SHRUBS. A. T. DeLaMare Co., Inc., New York. 1952.

Wyman, Donald. GROUND COVER PLANTS. MacMillan Co., New York. 1956.

Wyman, Donald. SHRUBS AND VINES FOR AMERICAN GARDENS. Macmillan Co., New York. 1949.

Wyman, Donald. TREES FOR AMERICAN GARDENS. Macmillan Co., New York. 1951.



The Rev. John Croumbie Brown, L.L.D., F.R.G.S.

JOHN CROUMBIE BROWN

A Pioneer of Botany and Forestry at The Cape of Good Hope

by **Phyllis Nobbs**

Excerpts from the article which appeared originally in the Journal of the South African Forestry Association, April 1956.

THE REV. JOHN CROUMBIE BROWN LL.D., Colonial Botanist at the Cape of Good Hope and Professor of Botany in the South African College, Cape Town, Fellow of the Royal Geographical Society, Fellow of the Linnean Society, and Honorary Vice-President of the African Institute of Paris, was born on May 16, 1808 and died September 17, 1895. He was the eldest son of Samuel Brown, originator of "Itinerating Libraries," and Elizabeth Duncan, "in all things an excellent wife." His grandfather was the Rev. John Brown of Haddington, the famous Scottish theologian and author of the "Self Interpreting Bible," and many other religious works.

The Rev. John Croumbie Brown was trained as a Congregational minister and was sent out to the British and American Congregational Church in St. Petersburg. During his ministry he went to America to raise money to build a new church. The appeal was successful and he laid the foundation stone before leaving Russia in 1840. He was for a short while at Beverley in Yorkshire. On August 24, 1844, he first landed in South Africa having been given the pastoral charge of the Congregational Church, worshipping in Union Chapel, Church Square in Cape Town. The site is now occupied by the new portion of the Civil Service Club on whose walls hang three pictures of the demolished Chapel. Four years later, having succeeded in making this congregation self-supporting as asked when appointed, he returned to Scotland.

He became a United Presbyterian Minister and in 1849 took charge of Belmont Street Church, Aberdeen, with a salary of one hundred and twenty pounds per annum. However, there were educational facilities for his family and he, himself, gave scientific lectures and studied botany. On April 22, 1853, he was appointed lecturer in botany in University and King's College, Aberdeen, and in 1858 was given the degree of LL.D. He resigned from this post on accepting the appointment as Colonial Botanist at the Cape of Good Hope and Professor of Botany in the South African College at Cape Town from April 15, 1863. The official communication to him of this appointment stated, "This office, originally established in the year 1858, was created with the two-fold object, firstly of ascertaining and making generally known the economic resources of the Colony as regards its indigenous vegetable production and its fitness for the growth of valuable exotic trees and other plants, and secondly, of perfecting our knowledge of the flora of South Africa and thus contributing to the advance of botanic science."

He succeeded L. Pappe, M. D., as Colonial Botanist who, in his report in 1859 to both Houses of Parliament of the Cape of Good Hope, refers to his being able "to collect much valuable additional information and material for a new edition of the Silva Capensis" which was his Description of South African Trees and Aborescent Shrubs used for Technical and Economical Purposes. This second edition was published in 1862.

Dr. Brown's salary was three hundred pounds per annum and one hundred pounds allowance for travel. Both his and Dr. Pappe's reports make interesting reading. The report of 1866 shows how Dr. Brown's advice was sought by the farming community. In his writings he says "Time and again I was told: 'Give us water and we will grow anything'." He combined in a remarkable degree, very unusual in those days, religion with science.

In his tours during both sojourns at the Cape in the course of carrying out his duties, Dr. Brown was horrified at the aridity he saw, the barren sand areas, the extensive and severe droughts, the damaging floods and inundations, the amount of available water going to waste and the deliberate destruction of indigenous forests that had been continued for centuries. He set about studying these problems and suggesting how these sands could be stabilized and made productive, the excessive water stored and utilized and the indigenous forests protected and expanded on to unused Crown Lands and exploited in accordance with modern forest science to the great ultimate benefit of the Colony. He prepared memoranda on these subjects and enclosed them with his annual reports. The titles are illuminating and show, besides botanical researches and study of the capabilities of the Colony, the breadth of his outlook and the useful work he was in the midst of doing. It was a great blow to him, when, owing to the financial position of the Colony, retrenchment was deemed necessary and, among the measures to carry this out, was the abolition on December 31, 1866 of the post of Colonial Botanist.

Dr. Brown returned to Scotland in 1867 and became minister to a congregation in Berwick-on-Tweed and, on his retirement some years later, was presented with a sum of money which he expended towards the publication of a work entitled HYDROLOGY OF SOUTH AFRICA, still a reference book on the subject. He never lost his interest in South Africa and several of his works were the outcome of the memoranda and treatises that he had prepared whilst in that country. He spent the last twenty years of his life in Haddington, Scotland, collecting and veri-

Nerine sarniensis—the larger flower is a red form, the smaller a pink form of the Guernsey lily.

Erica cerinthoides, red-flowered on right; *E. Bowieana*, greenish white flowered on left.

Gladiolus grandis Africander—the flower is brown with darker brown spots on the inner side of the petals.

fying, compiling and writing books on forest science and allied subjects drawing on the experiences of his long life during which he had traveled at his own expense in Europe, the United States and South Africa. He kept up a correspondence with scientists and others in all these countries and was an active member of the Scottish Arboricultural Society. As an outcome of its activities, facilities for the study of forest science in the United Kingdom were widened and in 1884 the International Exhibition of Forestry was held in Edinburgh. Dr. Brown was awarded two medals, the silver one being inscribed "For Books on Forestry." Both medals are in the possession of his grandson Dr. Eric A. Nobbs, himself the recipient of medals from the University of Edinburgh for forestry and agriculture.

Appreciation of his works is shown in notices published in many countries. His books may be read with profit even today. Incidentally, his writings convey a very interesting picture of the Cape of Good Hope and the problems of the farmers there nearly a century ago. In 1892 his eyesight began to fail and his manuscripts, mostly on forestry and allied subjects were unfinished. That he meant to continue the series is evident from the list on his printed sheet *Bibliotheca Capensis* of which those in italics were never published. At his death, and in accordance with his wishes the boxes containing these notes, cuttings, booklets and papers were deposited in the South African Library for safe keeping and now, as seems most

(Continued on page 177)

Disa uniflora, the two lower petals are scarlet, the upper pinkish with scarlet veins.

Leucadendron argenteum—the female flower of the "silver tree," indigenous to the Cape Peninsula and within thirty miles of Cape Town. The surrounding bracts are greenish, entirely covered on both sides by fine hairs, making the entire leaf to appear silver-colored in certain lights. The tips of the leaves are deep crimson; the circlet of flowers yellow.

Rochea (*Crassula*) *coccinea*—this vivid red flower is popularly known as "Pride of Table Mountain."

A Country Housewife's Garden

by **Gertrude B. Foster**

THE "COUNTY FAIR" on Labor Day week-end marks the end of summer in the garden. It is a real old-time country fair with tents housing most of the exhibits. The only exceptions are a large cement-block cattle-shed and a Quonset hut put up after World War II for protection of the valuables in the handicraft and hobby departments. We love to arrive early in the morning of the first day. We find a canvas city with round ferris-wheel skyscrapers and a five-armed metal "octopus" which mushroomed up in the grassy meadows overnight. The smell of trampled grass in the sun is part of the excitement of a circus or fair in the country.

The week before the fair is one of anxious watching and waiting. Will there be five Italian canner tomatoes of similar size and ripeness to fill a plate provided by the judges? Will the pumpkin ripen to a bright gold on all sides? When it is hot and dry, can the recently potted herbs perk up enough after transplanting to make a showing?

Last year Rosemary decided to try milk-feeding a pumpkin for the fair. She had read about it in one of Laura Ingalls Wilder's wonderful books on pioneer life, which were written for children but would truly delight any adult over twenty. The finest green bulge at the end of a flowering stem, which marked the beginning of a pumpkin, was selected for this special treatment. All other blossoms on that line of succulent stem were removed. Then a small slit was made about two inches back of the swelling fruit, on the under side of the stem. A piece of lamp wick, four inches long and an inch wide, was carefully inserted in the cut in the stalk. The end of the wick was placed in a small can which was to be filled with fresh milk each day. In the book, the pumpkin drank and drank and grew to be the largest in the county.

Perhaps we were born too late to make a pumpkin drink milk, or perhaps we simply didn't carry out the instructions to the letter. Anyway, the cucurbit rarely got any of the lactile fluid. The first night the milk soured in the heat of mid-August, making it too thick to feed properly. The second night the wick and can disappeared entirely. By poking around under the leaves of the pumpkin vine, we found that a mouse had taken wick can and all into a hole it had made in the soft soil of the compost pile on which Rosemary had planted the pumpkins. After a few sporadic attempts to replace the wick in the morning after the mouse had had its fill at night, the project was abandoned by the ten-year-old Girl Scout gardener. However, the vine suffered no injury and several nice "jack-o-lanterns" resulted even though there were no fruits large enough to exhibit at the fair.

Once committed by an entry blank to produce a half bushel of potatoes, five tomatoes or an arrangement for a hall table, the gardener who makes a Labor Day week-end fair the goal for summer produce may be in for some surprises. One year we entered our potatoes as 'State of Maine,' as there was no place on the entry blank for 'Katahdins.' The judges noted our error and were kind enough to give them a prize anyway. The following year the premium list included a place for 'Katahdins.' Over the ten years which we have been privileged to enter in the Goshen Fair in Connecticut, we have added several items to the entry list. The first time we put in a collection of herbs there was no class for them. Since then, however, the list always has an entry for "Herbs" and one for "Professional Herb Exhibit—five foot space."

Among the vivid colors and huge blooms of dahlias and gladiolus, a miniature garden of herbs might seem to be obscured. It is as demure and primly unfloriferous as a Quaker bonnet would be at a showing of Sally Victor hats. But year after year, we have noticed that the herbs attract a crowd to their small space in the horticultural tent. It is not only their fragrance which attracts people, but the form and colors of the foliage. Perhaps there is some sort of racial memory evoked. The sight of them stirs an intuitive knowledge that here is the source of flavoring and healing in days when the necessities of life were wrested away from the soil by hand rather than arriving wrapped in layers of aluminum and cellophane.

We have tried many different ways of exhibiting herbs in the Goshen, Connecticut, fair. One year we did an "Herbal Object Lesson" as described by Mrs. Frances R. Williams in The Herb Grower Magazine. A pot or paper cup containing wet sand or vermiculite with sprays of a particular herb inserted in it stood in one compartment of a large divided paper plate. The object which the particular herb flavored was provided in another section of the plate. A tomato contrasted nicely with the bright green of sweet basil which is used to season tomato dishes. Peppermint sprigs were related to candy and chewing gum in which the flavor is so familiar. The possibilities are unlimited.

A card giving the name in English and Latin was included with more data about the use of the herb in the third division of the paper plate. More details about setting up an "Herbal Object Lesson" display may be obtained by writing to The Herb Grower Magazine, Falls Village, Connecticut, for a reprint of Mrs. William's article.

Another year we secured large wooden cheese boxes from our grocer, stained them and filled them with full-size plants of herbs. Actually the separate plants or parts of plants stuck in pots or paper containers seem to be more popular with the public. The judges are most generous with their blue ribbons for any and all herb collections we have entered. To our regret we have had competition in the class only once in ten years.

It is easier to label individual plants. Their form, which is half the charm of herbs, shows up better. We liked the geographic display assembled one year. Paper cups filled with sprigs of oregano, sage, angelica, and savory were set on a large map of the world. The countries in which these herbs are culinary favorites guided the placing of the cups. Cards were placed in front

of each one explaining its position and importance in cooking in that land. The exhibit was entitled, "Seasonings from Many Lands Grow in a Connecticut Garden." Where possible foods in cans or packages flavored by the herbs were included. Tomato paste made in Italy and seasoned with basil was one such example.

Last year Rosemary designed a small-scale knot garden in the square frame which we had used to make our cement paving stones. It is twenty inches square with two-inch deep sides. This meant using very short sprigs of herbs inserted in vermiculite that filled the frame to within a half inch of the top. For paths between the beds, we used buckwheat hulls which have a nice dark brown color of earth. The garden kept so fresh, with short stems of thyme, santolina, nepeta, Roman wormwood and germander stuck into the moist vermiculite, that several weeks after we brought it home we found some of the golden-edged thyme sprigs had rooted.

To make further use of the five-foot space allotted to exhibitors of herbs, we added another educational exhibit. A little, old, weathered dome-shaped bee skep which came from Rosetta Clarkson's garden at Salt Acres was surrounded by cups of herbs attractive to bees. Lemon-balm, catnip, anise-hyssop, mountain mint, basil and thyme were placed about the bee skep. Cards were used to explain the relationship of the plants to the old-time bee hive.

When the Goshen Fair is over, the children go back to school. Then the gardener feels that she has begun a whole new year. There is time to plan next season's beauties in the garden. All of the spring-blooming herbs can be moved or divided. Seeds of larkspur, chervil, parsley and poppies should be sown to give the plants a chance to grow in the cool moist days of early fall. Other perennials, such as orange milkweed, lavender, angelica, sweet cicely and thymes, may be sown in late October or early November for germination the following spring. Nature stores them better than we can and they benefit by freezing before spring sowing.

Autumn gardening is almost more satisfactory than spring planting. There isn't any sense of urgency after the first killing frost. All that is done is by way of investment for next season. It is not necessary to rush towards a flowering or fruiting date. Our success with lilies, tulips and other small bulbs planted after December first one year makes us think that it is often possible to work in the garden until snow covers it. It's fun to have a hand in nature's "lay-away-plan" for Easter glories.

GROUNDCOVERS (from page 163)

grower, light blue flowers, clumpy in growth and therefore not spreading as rapidly to cover large areas; and *multiplex*, with double purple flowers.

Only a few deciduous shrubs are useful as groundcovers. The following have some merit under certain conditions:

Chaenomeles japonica alpina, alpine Japanese flowering quince. M-Su-Sh-A-L. Single orange flowers on a dense low shrub. Best results in full sun in almost any good soil. Lowest of all the *Chaenomeles*, rarely exceeding twelve inches in height.

Cornus stolonifera Kelseyi, Kelsey dwarf dogwood. M-Su-Sh. An excellent dwarf groundcover, rarely exceeding two feet in height. Dark red stems give interesting winter effect.

Forsythia, Arnold Dwarf. M-Su-Sh. This new introduction might well be considered for large areas and slopes. Irregular shape, very dense; the stems root where they touch moist soil.

Hypericum Buckleii, Blueridge St. Johnswort. S-Su-A. Almost creeping, rarely over ten inches tall; develops to a round mat several feet across. Yellow flowers in June.

Hypericum calycinum, Aaronsbeard St. Johnswort. S-Su-Sh-A. Very good for sandy soil in semi-shade. This species is half-evergreen and has yellow flowers most of the summer.

Indigofera incarnata alba, white Chinese indigo. M-Su. Attractive white pea-like flowers on a dense low shrub. As with the following species, even if the tops are winter-killed, it will sprout and flower on the current year's growth; both spread by underground stems.

Indigofera Kirilowii, Kirilow indigo. M-Su-Sh. A little taller than the preceding, with vigorous suckering habit, and having rose-colored flowers. Fine for steep slopes.

Rhododendron obtusum, M-Su-Sh-A. This species is strangely unknown in the trade. Slow growing, making an irregular compact mass rarely over two feet tall. Rosy purple flowers, almost evergreen foliage.

Vaccinium angustifolium laevifolium, lowbush blueberry. S-Su-Sh-A. For broad areas of naturalistic planting. Fine for highway planting on large slopes, of limited use in the small home landscape.

Xanthorhiza simplicissima, yellow-root. M-Su-Sh-A. For large areas, making a dense mass of finely-cut foliage. Moist soil in sun or shade.

Many vines are useful as groundcovers for large areas, for rough uneven land, or for pockets where soil conditions are poor. The following are among the best:

Akebia quinata, five-leaf akebia. Su-Sh. A rampant grower for open woods or large slopes. Not a neat plant, hence not for limited spaces or where it will smother out more desirable growth.

Celastrus, bittersweet. In variety. Su-Sh. For large areas and slopes, especially near the seashore. There are several good varieties; *flagellaris*, the only thorny variety; *orbiculatus*, a rampant grower with yellow and red fruit; *orbiculatus punctatus*, similar but with orange and scarlet fruit; *scandens*, a vigorous and possessive vine, especially good near seashore.

**Euonymus obovatus*, running euonymus. Su-Sh. A very hardy deciduous euonymus, spreading rapidly, with scarlet berries and brilliant red autumn color.

Hydrangea petiolaris, climbing hydrangea, Su-Sh. Good for large areas, especially open woodland. Lustrous leaves, showy white flowers in June.

**Lonicera Henryi*, Henry honeysuckle. Similar to but hardier than Halls honeysuckle, therefore better for the northern parts of New England. Flowers purple or yellowish red, fruit black.

**Lonicera japonica Halliana*, Halls honeysuckle. Su-Sh. A standard groundcover for large areas, especially steep slopes. Trumpet-shaped white or yellowish, black fruit. This and the preceding should never be used where they have opportunity to climb over other plants.

Lycium halimifolium, matrimony-vine. Su-Sh. A coarse woody vine useful for erosion control of large areas, where an attractive appearance is not important.

Parthenocissus quinquefolia, Virginia creeper. Su-Sh. Fine for open woodlands, brilliant red autumn color.

Rosa, 'Max Graf.' Su. An excellent choice for bank or slope planting, with showy single bright pink flowers in June.

Rosa Wichuraiana, memorial rose. Single white flowers in clusters, probably the best rose as a groundcover. The fast-growing shoots root readily and help to stop soil erosion.

A great many herbaceous perennials make most useful groundcovers. There are so many varieties that even to list them without descriptions would take too much space. Among the genera most frequently used for this purpose are the following: *Ajuga, Alyssum, Arabis, Arenaria, Armeria, Artemisia* (dwarf varieties), *Asarum, Campanula* (dwarf varieties), *Dianthus, Dicentra, Epimedium, Gypsophila* (dwarf varieties), *Hosta, Houstonia, Iberis, Iris* (dwarf varieties), *Mentha, Nepeta, Phlox* (dwarf varieties), *Polemonium, Sedum, Thymus, Veronica* (dwarf varieties) and *Viola*.

Among the outstanding species are the following:

**Ajuga reptans*, carpet bugle. For sun or shade, in almost any kind of soil, this virtually evergreen perennial is one of the most dependable of all groundcovers. Green leaves, blue flowers in May. Many good varieties including *alba*, green foliage, white flowers; *rubra*, bronze-red foliage, deep purple flowers; and *Tottenhami*, bronze-red foliage, blue flowers.

**Dicentra eximia*, fringed bleedingheart. For sun or shade in any humus-rich soil, this splendid plant provides a solid groundcover of finely cut leaves, with rosy purple flowers over a long period. Especially noteworthy is the variety *alba with flowers pale pink when young and white when mature.

**Epimedium macranthum*, longspur epimedium. This and *grandiflorum* varieties *niveum, roseum* and *violaceum* make fine groundcovers especially in semi-shade. The flowers are white, pink or purple. Other species have yellow flowers. Epimediums spread by underground rootstocks.

**Houstonia serpyllifolia*, creeping bluets. An extraordinary native species from the southern highlands, making a solid mound of tiny evergreen leaves smothered with small blue flowers in spring. Wherever moist soil rich in humus can be provided, *H. serpyllifolia* will give noteworthy results.

**Veronica repens*, creeping speedwell. A prostrate mat, with rose or bluish flowers in May. Very neat.

Ferns are excellent groundcovers for specialized use in the naturalistic garden and as an underplanting with rhododendrons and azaleas. Most enjoy partial shade, some are only inches high while some grow to three feet or more.

DIANTHUS (from page 158)

Set the small plants about four inches apart and in rows for ease of cultivation and care. Nothing is more appealing than neat straight rows of small dianthus seedlings. Their grey-green foliage thickens into sturdy little cushions. Standing out against the rich dark earth, they provide a beautiful focal point for your tour of the garden to see what has grown since yesterday, or since two hours ago!

A greenhouse isn't vital to raising and naturalizing small dianthus, however. You can plant them equally successfully in the open ground in mid-May. Thin them once to four inches apart. The ground where the seeds are to be sown must be dug and worked until it is fine and beneficial for the sprouting of very small seeds and the nourishment of tiny hair-like rootlets.

Whether your plants were greenhouse nourished or started in the open ground, the first summer of growth is one of "tender loving care." Keep seedlings weed free, never allow them to dry out, keep a hose handy with a spray nozzle on the end. Cultivate after a rain. "Snarol" on the surface of the ground will help, if cut worms inhabit your acres. A little extra care will give you sturdier growth. Leave the plants in the nursery through the first winter, covering them with leaves (branches will keep the leaves from blowing off) or mulch of some sort. The following year, come April when the earth begins to stir, set the plants out in the area where you want to naturalize them.

To naturalize dianthus in a field you must dig a good spot for each plant, removing all grass roots and clearing a space around each plant. The dianthus will take over if at first given a very good start. Keep grass from growing over them the first year or two. Water in dry spells the first year. Eventually you let the field grass alone. Dianthus come up along with the grass and merge with it, but at first need protection to allow the plants to build strength and vigor for the "neck and neck" race. The area may be cut, not too low to the ground, once a year, preferably in September. By this time the plants have had a chance to reseed. Year after year the dianthus will grow and multiply, sending fragrance over your entire acreage.

Ours grow in our field within fragrance range of our sleeping porch. We are naturalizing many things within range of this porch. We like to sleep on summer nights in our Connecticut acres with nature's scents about us, along with the haunting sound of the whip-poor-wills.

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CHINSEGUT HILL

by **Joseph Monachino**

J. K. Small's **Manual of the Southeastern Flora** published in 1933 is still today the standard reference work for the plants of that large section of the United States. There is no other comparable manual. Yet it is obvious to anyone who has used Small's Flora that much of it is obsolete, deficient or erroneous; its nomenclature and the delimination of species are particularly faulty. In the last quarter of a century there have been numerous contributions to the botany of the Southeast, but these have not been incorporated in the Manual. Small's **Manual of the Southeastern Flora** urgently needs to be brought up to date, and George R. Cooley has taken steps to see that this task is accomplished. He has spark-plugged interest in various botanical institutions and many individual botanists, organized collecting trips and accumulated herbarium material, and has inspired botanical research of the vegetation of the southeastern states, much of it financed by himself. Incidental to the overall southeastern program, Mr. Cooley will aid the new University of South Florida, which will open near Tampa in 1960, by turning over to it equipment and herbarium material when no longer needed. Much is likewise being done for the existing University of Florida at Gainesville.

George R. Cooley was an investment broker until his retirement four years ago. He is now a research fellow of Harvard University and a life member of The New York Botanical Garden. His home is at Rensselaerville, New York, but he lives at Chinsegut Hill, Florida, Starkville, Mississippi, and Leesville, Louisiana, to aid the Southeast project.

The University of Florida offered the use of Chinsegut Hill for field headquarters. Joseph Monachino of The New York Botanical Garden spent his vacation period in March at Chinsegut Hill, and the following is his highly personalized account of his stay there.

FROM MARCH 1 TO 29 of this year, I vacationed at Chinsegut Hill near Brooksville, Florida, as a guest of Mr. and Mrs. George R. Cooley. The place is fifty miles north of Tampa, on the Gulf side of middle Florida. My object was to help build an herbarium of the state plants for the University of South Florida, and also to contribute to the ambitious project of a new southeastern Flora. The motivating force for this venture has been and is, chiefly, Mr. Cooley himself.

Chinsegut—what an exotic sounding name! We were told that it is American Indian and means the place where values lost can be regained. "I don't think," said I, "that any Indian would ever entertain such a subtle thought." Dr. H. A. Gleason, who was also a guest at Chinsegut at the time, looked me squarely in the face and, in his characteristic decisive tone, asserted "I don't think so either!" For the sake of the poetic beauty in the sentiment, however, I hope we skeptics were both downright wrong.

My principal work at Chinsegut was collecting, pressing, and identifying plants. The identifications were provisional, of course, for we had no proper literature nor comparative material at hand. By use of Small's Manual only, one could be led wonderfully astray. Trustworthy identification must be done at a large herbarium.

The season had been delayed about a month because of the unusually cold weather, and this meant that plant collecting would be poor. We did manage, however, to obtain some two hundred and ten numbers, representing about one hundred and thirty species. Certain numbers were collected in huge series to compensate for the paucity of species.

We resided in a colonial-type mansion of more than twenty commodious rooms, set on top of an oligocene low hill (said to be the second highest in Florida) in a large estate. The manor had been the property of Colonel Raymond Robins who willed it to the United States Government which, in turn, leased it to the University of Florida at Gainesville. Colonel Robins was a philanthropist interested in the social aspects of labor; so colorful, he was almost legendary—a miner (his fortune was made in Klondike gold), lawyer, ordained minister, and a friend of "Teddy" Roosevelt and Thomas Edison. The building is now known as Chinsegut Hill Library; the name is a misnomer, although it really has a library with some books on labor consulted infrequently. There was maid help in the house and a negro handyman for the grounds. The largest share of the many expenses for the whole management was paid by our host.

On the grounds of the estate grow many old exotic and native trees, immense live-oaks and long-leaved pines, palms, a lofty *Araucaria,* flowering *Cinnamomum* and avocado, *Grevillea, Eriobotrya,* a species of *Eucalyptus* with light smooth trunk, and another with thick fibrous bark colored rich brown like that of the redwood. Large plantings of *Rhododendron* of the Indica group in various shades of rose-purple and white were in full bloom in March. The odor of *Osmanthus fragrans,* possibly the most fragrant flower in the world, pervaded the lawn. Farther off, round about in the jungle-tangled border and running into the scrub, shiny dark green-leaved *Aridisia crispa,* with its bright red drupes or sometimes cream-white (a variety not mentioned in Bailey) is naturalized profusely. During my stay at Chinsegut, *Loropetalum chinense* came into bloom, and I prepared a specimen of it. This shrub, a member of the Witch-hazel Family, in flower presents a frilly white appearance much like that of our fringe-tree.

The citrus groves furnished us with

The colonial mansion with its spacious lawn at Chinsegut Hill.

a rich supply of grapefruit. Mr. Cooley climbed the trees with surprising agility and snatched the fruits by use of a pole with a nail attached as a hook, while I gathered and placed them in a basket. A quantity of grapefruits had fallen prematurely, due to the cold weather, and lay in close clusters throughout the grove, just rotting away. Between dodging the falling grapefruits that were being knocked down (I rather suspect that Mr. Cooley was aiming at me most of the time, and I'm no catcher!) and skipping over those that lay squashed on the ground, I had need of being nimble!

From my one-month experience, I'd say that twenty to twenty-five percent of the wild plants seen in the Brooksville area are of the same species known to us in the New York district. The flowering dogwood and the redbud, the liquidambar, blue-beech and hornbeam (the southern varieties were in Florida), the inkberry and chockberry, the partridgeberry, fly-poison, green dragon, dwarf dandelion, sleepy catchfly, primrose- and lanceolate-leaved white violets, royal and cinnamon ferns are a few examples.

One might wonder what concordance there is between the progress of spring in the South and in the North. With the blooming of the flowering dogwood here in New York, we know that spring is well on its way. At Brooksville, it hardly appeared like true spring and yet the flowering dogwood and the liquidambar were fully in bloom.

Of the typically southern plants, the sweet jasmine was in blossom everywhere when I arrived. A very small-leaved viburnum *(V. obovatum)* was quite ubiquitous and lasted in bloom the whole period. A simple-leaved blue lupine *(L. diffusus)* was equally abundant, wide spread and long lasting. It was one of the showiest plants, forming bold mats over three feet across. *Berlandiera subacaulis* (I am judging the species from memory as I do not have the specimen for comparison here), a composite with a tuberous taproot, came into bloom shortly after my arrival. Its yellow flowers had the kind of sweet-spicy fragrance I have always associated with Italian saints' fiestas. *Ceanothus microphyllus* just came into flower before my departure. The minuscule triplinerved leaves of this rigid slender-stemmed shrub must be the tiniest in the genus. There were three species of *Pinguicula* blooming at the same time in the same area. The sisyrinchiums, a confusion taxonomically, when in mass were the loveliest supernal blue. The sheep-sorrel of the area, *Rumex hastatulus,* is taller than ours but likewise rampant. In flower at the time of my departure, it colored fields oxblood-red. The blue toadflax was also an abundant weed in fields. From the speeding car, as we were bound for the airfield, *Linaria* appeared like windblown blue mist, and *Rumex* was such a splashy loud red, almost a clarion crimson, one could nearly hear it!

There was a problem in identifying *Viburnum obovatum* Walt. Our plant answered the description in Small's Flora but also matched *V. corymbosum* (Miller) Rehder in the herbarium. The latter binomial did not appear in any of our literature. When I returned to The New York Botanical Garden, I found that Rehder had published the new combination to supersede Walter's name; but I also discovered that it was illegitimate for there was an earlier *V. corymbosum* Urban, and furthermore the original illustration of *Cassine corymbosa* Miller, Rehder's basonym, did not look like *V. obovatum*. After assembling all these facts, I made another discovery. W. H. Duncan had come to conclusions identical with mine sometime ago and had already published them! At Chinsegut, with flowering material only, there was also some doubt regarding *V. Nashii* Small, distinguished from *V. obovatum* principally by its fruit. Back in New York and with the type specimen before me, however, I am convinced that *V. Nashii* is merely a variation of *V. obovatum* of no specific value.

Mrs. H. A. Gleason, Joseph Monachino, and Dr. Gleason relax at Rainbow Springs—March 16, 1958.

Houstonia procumbens was another of the very common plants. It is known in literature as monovarietal, but after examining hundreds of plants in the field, we could see two subspecific taxa represented, differing in minor pubescence character. The difference is a quantitative one that would be difficult to appreciate in herbarium material, although quite clear in the field. Dr. Gleason was with us at the time, and he also examined numerous plants growing and admitted the clear distinction. Picture the renowned Dr. Gleason on his knees kowtowing to a procumbent *Houstonia!* I still do not understand why we could not find at least some intermediates. Both kinds were blooming at the same time, were represented by long and short style forms, and were often growing together. Incidentally, the species is described by Small as having the corolla glabrous within. On the contrary, the corolla is clearly pilose at the throat within, the pilosity overflowing into the central part of the limb.

Of the arborescent plants, the oaks were most interesting because they dominated the field and because of the diversity of species and their variation. When I was about to leave, many were in bloom and showed the difference in color between the several species. The young leaves of the Turkey oak *(Q. laevis)* were a sulphur-yellow or, according to "Munsell Hue," a deep or strong yellow. It was amazing to see a gigantic live-oak choked with Spanish moss, except for the small end branches, and the small tufts of leaves on these twigs comprising all the foliage for the mountainous bulk of the mammoth tree.

The last plant I should like to touch upon is the poison-ivy, which carpeted the ground in many places, particularly where violets were to be dug up. I did manage to acquire a generous case of dermatitis in both hands.

It would seem that there is very little virgin country in Florida. Cattle and citrus culture are doing a job of annihilation almost as efficiently as the bulldozer. Since the topography is flat and most of it easily accessible, I surmise that within twenty years wilder sections will be found in some of the rocky, hilly places near New York City than in most of the State of Florida. I recall how in Annatteliga Ham-

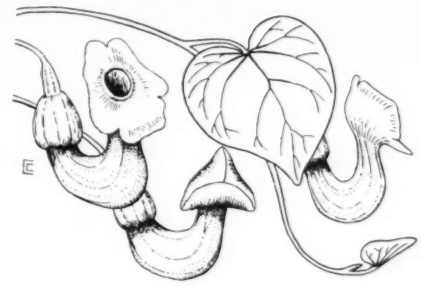
mock we speculated whether we had finally penetrated virgin woodlands. Then we saw adult grapefruit growing there! We speculated on how the grapefruit reached the remote site—perhaps by birds? Mr. Eaton broached the subject of what constitutes naturalization and whether these trees could be considered a proper example of naturalization. Then, lo and behold, I observed that these grapefruit trees had been grafted!

Two areas—both in Weekiwachee Springs, Hernando County—we found quite interesting. One is a "prairie" characterized by the presence of *Pinus clausa*. There we saw the endemic *Garberia heterophylla* and *Gardoquia coccinea*. The other area is a riverine bog-like woodland that has a northern aspect. *Saururus* and *Arisaema* grew there; the latter was in flower, *A. acuminatum*, with the reflexed tip of the lightly glaucous, green spathe long and finely caudate. This Jack-in-the-pulpit is not considered a good species, but a hybrid, by G. G. Huttleston. It was abundant and constant in its characters. I collected a large series so that the taxonomy can be eventually re-evaluated if necessary.

The synonyms of *Gardoquia coccinea* (Nutt. ex Hook.) Alexander are *Clinopodium coccineum* (Nutt. ex Hook.) Kuntze and *Gardoquia Hookeri* Benth. If the species is placed in the genus *Satureja* (that is where we have it in the herbarium of The New York Botanical Garden), there apparently will be a new combination in search of an author!

Five metal herbarium cases arrived on March 7, and the next two days were entirely devoted to setting the herbarium in order; thereafter, we always did some work daily towards its maintenance and improvement. Manila folders, such as we use for genus covers, were made for every species. The mounted specimens were arranged in the same sequence we have here at The New York Botanical Garden.

At the time of my arrival, Dr. and Mrs. Gleason were at Chinsegut and also Arthur Stanley Pease, Pope Professor Emeritus of the Latin Languages and Literature at Harvard University. Prof. Pease helped the herbarium by noting on the covers the derivation of the scientific names and also by indicating accent marks. Of all things, Prof.



Pease was an ingenious punster! *Pax vobiscum* and peace be with us! Dr. I. M. Lamb came from the Farlow Museum of Harvard to study marine algae; his cottage was named by Prof. Pease *Chenopodium album*, that is to say, Lamb's Quarters.

Dr. Gleason studied the genus *Carex* of Florida and prepared a new key to the species. I found him as vibrant as ever. He stands at the summit of his years and as though viewing from a high pinnacle, he comprehends broad vistas. One of the discussions I had with him that should be of special interest, as reflecting on some of the basic philosophy of the NEW BRITTON AND BROWN ILLUSTRATED FLORA OF THE NORTHEASTERN UNITED STATES AND ADJACENT CANADA, Dr. Gleason stressed that he did not approve following rules of nomenclature to the letter when by doing so stability of names would be impaired. By such use of the rules would be destroyed the very spirit of the rules. Priority, in itself, is nothing sacred; it is of value only inasmuch as it contributes to nomenclatural stability. The basic criterion should be stability. One is justified, he said in gist, to argue roundabout and sophistically (even like a shyster lawyer!) to circumvent a change. Of course, ultimate stability is what we all strive for, and in generalities, one might get lost in abstruse dialectics, except that wise Dr. Gleason, with a world of good sense, brought the matter to a concrete example. The two latest northeastern manuals, Gray's 8th and the New Britton and Brown, are intended for students, he pointed out. When the two agree on a name, as they most often do, that should be conclusive regardless of rules, priority, homonymy and the whole legislatorial babble. For instance, *Lotus americanus* Bisch. (1838) is accepted by both Gleason and Fernald. What if it is a later homonym of *L. americanus* Vell (1825)! Let the matter rest. Do not confuse the student with still another name. If the change in *Lotus* is sanctioned, that will not be all. There will be other nomenclatural shifts. For example, the black swallow-wort, long familiar not only to American botanists but also to the Europeans as *Cynanchum nigrum* (L.) Pers. (1805), is a later homonym of *C. nigrum* Cav. (1793), and one must call it *C. barbatum* Breit, or some other obscure name. What a sure way to confuse, discourage, defeat, and alienate the poor student! Names being arbitrary, as they are, by nomenclatural changes no further intrinsic knowledge of the flora is gained, nothing is learned about the true character of the plant, its structure, habit, distribution and proper classification.

The latest guest at Chinsegut, who remained when I left, was Richard J. Eaton of the New England Botanical Club. He was very good company and brimful of sparkling humor, a meticulous and observant collector. His preparation of specimens for the herbarium was a work of fine art. How with careful forefinger he adjusted petals and pedicels! But alas! he believed in very small samples, practically in unicates. "That," I said to Mr. Cooley, "must be his Harvard training." If all botanists were like Mr. Eaton, none could ever be accused of depleting a station!

Upon leaving, I was asked to sign the guest book and jot down some remark. Jocularly, I wrote a couplet that ran something like this:

The S. E. Flora will be done, surely!
For who's at it, but George R. Cooley!

But really, I do believe that Mr. Cooley will bring his pet idea to fruition — he has the energy and single-mindedness of purpose to do so.

REV. BROWN (from page 171)

appropriate, have been transferred to the recently established Institute of Forestry and Wood Technology of the University of Stellenbosch, where they will be readily available for reference.

His wife was a very good artist and her exquisite paintings of Cape flora must be among the earliest. Their charm lies in the artistry of the drawing and the accuracy of the coloring. Many of the flowers grow within a mile of our home on whose walls hang the originals of the paintings.

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NOMENCLATURAL EXCURSION TO EUROPE

by H. W. Rickett

THE *International Code of Botanical Nomenclature*, like other legal documents, is something one turns to only in need. The physiologists and geneticists, indeed, may believe that it does not concern them; the morphologists may look somewhat askance at it; but all botanists must use botanical nomenclature in reporting their work. Though even taxonomists, who created it, often regard the *Code* as a necessary nuisance, they know that only by means of this instrument have we been able in recent years to bring the naming of plants nearly into order from a condition that was far from orderly.

A curious feature of this set of rules is the exceptions that it includes. All family names end in -aceae—except a few for which a different termination is permitted. A generic name, to be considered validly published, must be accompanied by a description of the genus—except those published by Linnaeus in 1753. When several names compete for one family or genus or species—e.g. names given by different botanists—the rule is that the earliest is accepted; this is the famous principle of priority; and to this also there are exceptions. In 1905 a group of botanists pointed out that strict application of the principle of priority would force us to abandon many familiar names and use in their stead names we had never heard of. They suggested "conserving" these well-known names as exceptions to the rule—i.e. legalizing their use in spite of the priority of other names; and they proposed a list of about eighty names of genera to receive this treatment. This list, when it had been accepted by an International Botanical Congress, was the beginning of the list of *nomina conservanda* (names to be conserved) which still forms a part of the *Code*.

Additions have been made to the list at every botanical congress. It was astonishing, when one came to look at them, how many names of genera, names in common use, were antedated by unfamiliar names that had been published in obscure magazines or books, sometimes by persons of little or no botanical experience. The big tree of California was named *Americus* before it was named *Sequoia*; the former name, which has never been used, appeared in an anonymous pamphlet that strongly suggests the outlook of Phineas Taylor Barnum. Different genera have sometimes received the same name. *Cedrus* was used for a juniper and for a tree related to mahogany as well as for the cedar of Lebanon—and the latter was not the first to get the name. So the list of "nom. cons." has grown longer and longer, until now it approaches one thousand names. As it is published in the *Code*, it contains also the prior name or names that are to be rejected (*nomina rejicienda*) in favor of each that is to be conserved.

During the fifty-odd years in which names have been conserved, the rules themselves have undergone many changes. At first the meaning or "application" of a name was settled by the description or descriptions attached to it: you had to know just what characteristics were embraced, what sort of plants were to be included. How a name should be used was therefore very difficult to define, since the discovery of even one new species, for instance, might necessitate changing the concept of an entire genus. This was supplanted by the "type method," which consists of selecting, for instance, a certain specimen as the "type" of a specific name: not necessarily a "typical" or "representative" specimen of the species, but one to which the specific name is attached through all the vicissitudes of taxonomy. No matter how the species is divided or changed in rank or merged with others, the *name goes with that specimen*; what other specimens are thought to belong with it, under the same name, is a matter for taxonomic judgment and does not concern nomenclature. Likewise a species is selected as the "type" of a generic name. Just what a conserved generic name is to be used for is, therefore, determined pri-

(Continued on page 184)

BOOK REVIEWS

AN ENCYCLOPAEDIA OF ANNUAL AND BIENNIAL GARDEN PLANTS. C. O. Booth. 488 pages, illustrated, indexed. Macmillan, New York. 1957. $12.50

This is certainly not a book for the layman grower with just one or two annuals in his garden, but is excellent for those who raise a quantity of different plants themselves, and it is a particularly valuable work for the grower with a greenhouse or sunpit. It provides very exacting instructions and plenty of useful and inspiring knowledge both for outdoor and indoor growing.

The illustrations are excellent and clear, especially those in black and white. About a third of the encyclopaedia gives details of the general cultivation of annuals and biennials, describes all the ailments and troubles that may befall them and also tells how to arrange for color, height and season, which I find a great help in arranging borders. At the end of a detailed list describing some twelve hundred species there is an index of pests and diseases, a useful glossary of the meaning of specific names and also a list of suppliers of plants mentioned in the book.

It is explained in the introduction that the common horticultural varieties are not included as these keep on changing, but I feel something is lost by not mentioning at least the principal ones, even if it does date the book. Mr. Booth praises some of the plants a little too much and is liberal with his use of adjectives such as charming and showy. Several of the plants thus described, I have found to have little merit as show plants.

C. Roy Boutard,
Horticultural Director, Berkshire Garden Center, Stockbridge, Mass.

MODERN GUIDE TO HOUSE PLANTS. Ann Warren. 128 pages, illustrated, indexed. New Era Books, Clinton, Conn. 1958. 79c at chain stores and supermarkets; also for sale at The New York Botanical Garden

This little pocket-book is an excellent treatise of house plants, their care, uses and the special plants which are most popular and useful in the average home. The chapter on African violets is worth half the cost of the book. One finds on a little probing that the New Era Press is a subsidiary of Clinton Nurseries of Clinton, Conn. But don't let that deter you from buying the book, because they are one of the leading firms in that field in the East and have a wide distribution in this part of the country. At a time when so many of the larger books on house plants are out of print, this is a welcome addition.

Andrew S. Wing
Riverside, Conn.

EASY WAYS TO GOOD FLOWER ARRANGEMENT. Mary Badham Kittel. 120 pages, illustrations, bibliography. Studio Crowell, New York. 1957. $4.50

It is very difficult to convince anyone that an art or a craft is easy to do, but Mrs. Kittel has been most convincing in her book. Not only does she write and describe clearly the basic steps, but proves her points with excellent pictures of better than "good" flower arrangements and understandable diagrams.

Starting with simple steps and placements of three flowers, she does not leave the reader wondering what to do if she does not have three iris at hand with which to work. Mrs. Kittel shows how that same design may be accomplished with peonies, strelitzias, calla lilies, daffodils or gladiolus. Repetition of different materials in a five point arrangement again shows the possibility of substituting one kind of branch for another.

If the reader masters the line designs so clearly explained in the first part of the book, graduating to the mass arrangements should not be too hard. The summary at the end of this chapter is most important and should be of great help, as are all the summaries.

I wish this talented author had provided the reader with a little more on the subject of color. The color wheel which she describes is not one most commonly used by advocates of the pigment theory or found in the Handbook for Flower Shows which she recommends. Her two color plates are superb and suggestions for use of color are good.

The chapter on "Home Decorations" with basic backgrounds and re-employment of various plant materials for arrangements should have great appeal for the busy homemaker. Sketches of equipment, tools, also bases and basic containers, if followed simplify and really lead a student to easy ways of developing beautiful designs with flowers.

Margaret Dodson
Larchmont, N. Y.

NATIVE PLANTS FOR CALIFORNIA GARDENS. Lee W. Lenz. 166 pages, illustrated, indexed. Abbey Garden Press, Pasadena, Calif. 1956. $4.00

This handsome book, by the geneticist of the Rancho Santa Ana Botanic Garden, is a valuable addition to the scanty literature available on California natives of horticultural value. A colored frontispiece and one hundred excellent halftones illustrate almost all the species treated. The subjects selected were proved by long trial at Rancho Santa Ana Botanic Garden to be fully worthy of recommendation to gardeners. The text is first class and includes description, flowering time, distribution, propagation and uses of each species.

David D. Keck

THE MANGO. S. R. Gangolly, Ranjit Singh, S. L. Katyal and Daljit Singh. Large 8vo. 530 pages, 211 full color plates. Indian Council of Agricultural Research, New Delhi. 1957. $13, clothbound.

India is the home of the mango and there for four thousands years it has been honored as the finest of fruits. In the Philippines and Malaysia, most of the cultivated varieties of the mango are seedling races of the polyembryonic type which breed true. On the other hand, all varieties grown in India, except about ten grown on the west coast, are monoembryonic. This has led to the production of innumerable varieties; every tree raised from seed is potentially a new variety. Vegetative propagation to preserve the best strains dates back only four hundred years, so that today in India there are perhaps one thousand recognized kinds.

The need for proper classification of the chief varieties and scientific descriptions of them came to be felt acutely, when India began planning a national horticulture program; and to meet this need, the Indian Council of Agriculture Research in 1948 authorized a detailed study. This book is the outcome of that study.

Most of the book is taken up with excellent pictures and detailed descriptions of the chief Indian mangos, none of them known in the United States. Chapters also are devoted to history, botany, and culture. A comprehensive bibliography is added.

Edwin A. Menninger
Stuart, Florida

THE GARDEN OF CAPARRAL—Plants of the Lower Rio Grande Valley. Elizabeth M. Riess. 158 pages, illustrated, indexed. Vantage Press, New York. 1958. $3

This small volume offers popular accounts of ninety-nine plants of the region, mostly natives, each illustrated with a crude ink drawing. The botanical description is followed by the reputed folk uses of the plant and its name is given in Spanish, English and Latin, with translations of the latter. The whole book is marred by shocking inaccuracies such as the following: speaking of a *Centaurea*, "Flowers having radiant corollas are called starthistles;" of *Taxodium distichum*, "The bloom is *estrobilos* or cone-shaped. The seeds being enclosed in vessels, it is classed *angiosperma;*" and from the glossary, "*Aecernaceae*, acorn family." 'Nuf said!

David D. Keck

SOIL-PLANT RELATIONSHIPS. C. A. Black. 332 pages, indexed. John Wiley & Sons, New York. 1957. $7

The author of this very interesting and unique book is professor of soils at Iowa State College, Ames. He has not written a book on soil science as such but has dealt only with those phases of the subject that are of particular interest in the growing of plants. The book does not tell the reader the what, where, when, or how of plant-growing but endeavors to explain why things happen as they do in soil-plant relationships.

This is not a book for beginners. As a college text it would be used toward the end of the student's college career. Any other readers of the book should be equally well grounded in the fundamental sciences, particularly chemistry, physics, and mathematics. And it is well also to know that the author is thinking primarily in terms of growing farm crops.

The book is made up of twelve chapters. These are labeled soil composition, soil water, soil aeration, exchangeable bases, soil acidity, soil salinity and alkalinity, nitrogen, phosphorus and potassium. Its illustrations are almost entirely diagrams and graphs. A long list of the references cited in the text is appended to each chapter.

Among the many well-developed features in the book are those dealing with soil structure, the organic fraction, the soil profile, evapotranspiration, water supply and plant behavior, aeration of the soil in relation to root growth, release of nutrient ions from the exchange complex, soil acidity in relation to nutrient availability and the

growth of various species of plants, estimating nitrogen availability, nitrogen supply in relation to plant behavior, organic phosphorus in soils, potassium fixation and release in soils, and potassium-sodium relationships.

The author makes a number of points of special interest to the more particular gardener. For example, he suggests the possibility of highly important effects of vitamins, hormones, and antibiotics released during the decay of organic matter in soils. He points out that the available supply of most micronutrients (trace elements) in soils is markedly reduced by liming acid soils to high pH levels. Molybdenum is an exception. He says that nitrogen tends to increase the rate of growth of the tops of plants much more than that of the roots. He concludes that phosphorus recovery in plants from fertilizer applications to the soil seldom exceeds twenty percent. And he believes that sodium is a partial substitute for potassium only as a balancing agent and not in its essential role as a plant nutrient.

A summary of the more important points at the end of each chapter would add to the value of this book. An author index would be useful. And a few good photographic illustrations of plants and soils and of field and laboratory equipment would add to the interest for the average reader and, possibly, serve to clarify certain points more effectively.

FIRMAN E. BEAR,
Editor-in-Chief,
Soil Science, Rutgers University

RESEARCH IN PHOTOSYNTHESIS. Edited by H. Gaffron and others. 524 pages, indexed. Interscience Publishers, New York. 1957. $12

Photosynthesis research, like nuclear physics, has just about priced itself out of the reach of the independent investigator; the costly gadgetry and the highly specialized manometric and isotope tracer techniques required force most botanists, unless attached to large, well-subsidized research laboratories, to remain bystanders. The present volume mirrors this state of affairs. Most of the papers are from laboratories labelled almost everything except botany or plant physiology: laboratories of chemistry, biophysics, physical chemistry, biochemistry, radiology and radiation, medical physics, physical biology, and microbiology. These papers, with discussion, were presented at the Gatlinburg Conference in October 1955. This volume is, then, addressed primarily to biochemists and biophysicists, and presupposes diligent study of Rabinowitch's 3-volume treatise on photosynthesis (from the same publisher) plus a thorough knowledge of current journal literature. The general botanist may find the following subjects of exceptional interest: Kamen's discussion of "hematin compounds in the metabolism of photosynthetic tissues;" Tolbert's note on photosynthesis by etiolated plants; Tolbert and Zill's account of the "excretion of glycolic acid by *Chlorella* during photosynthesis;" Vishniac's brief paper on photoreduction in *Ochromonas* (this flagellate may grow by means of photoreduction and so provide a link between bacterial and higher plant photosynthesis). Phosphorylation by chloroplasts receives much attention. Granick succintly summarizes chloroplast structure in relation to photosynthesis. James H. C. Smith *et al.* discuss photochlorophyll. Bogorad reviews the reaction biosynthetic sequences leading to chlorophyll.

This symposium volume is valuable. The reviewer wonders, nonetheless, whether holding symposia less frequently would result in more mature, more solidly informative articles—just where does one strike the balance between the interest of investigators and those of libraries and of workers in adjoining subjects?

S. H. HUTNER
Haskins Laboratory

FLORA OF MANITOBA. H. J. Scoggan. 619 pages, indexed. Bulletin No. 140, Biological Series No. 47. Minister of Northern Affairs and National Resources, Ottawa, Canada. 1957. $5

Dr. Scoggan's attractively printed flora is a highly commendable work which shows careful preparation, independent judgment, and good sense. It will be the standard reference for the vascular plants of Manitoba for decades to come. Formal descriptions are omitted, but the annotated catalogue includes information on the general distribution of each species, the distribution and habitat in Manitoba, the earliest collection seen, the first report of the species for the province, and significant localities. The vegetation of the region is discussed in an introductory chapter. The book will be useful to professional botanists and to any interested person who can handle standard botanical terminology.

ARTHUR CRONQUIST

COTTON. Harry Bates Brown and Jacob Osborn Ware. 566 pages, illustrated, indexed. McGraw-Hill Book Co., New York. 3rd ed. 1958. $12

This edition brings up to date a book whose popularity and usefulness have been demonstrated amply. Containing as it does much information on marketing, competition from other fibers, and uses, it is necessary to bring to the reader's attention all of the new information on products and uses which have been developed. The chapters cover all aspects of the botany, agriculture, and industry of cotton. One chapter is devoted to the processing and products of cottonseed.

DAVID J. ROGERS

PRINCIPLES OF MODERN BIOLOGY. Douglas Marsland. 632 pages, illustrated, indexed. Henry Holt & Co., New York. 3rd ed. 1957. $6.50

This is a clearly written and well illustrated text, in which the author does not hesitate to penetrate as deeply into a subject as he feels is necessary. Like other "biology" textbooks, it is heavily weighted toward zoology, with more than twice as much distinctively zoological as distinctively botanical material. The author betrays his own non-botanical background by the small errors sprinkled through the botanical sections. He also credits a zoologist, Porter, with initiating the work with the electron microscope on the fine structure of flagella, whereas actually Porter's first paper on this subject was published four years after that of Manton, a botanist.

ARTHUR CRONQUIST

EVERGREEN ORCHARDS. William H. Chandler. 535 pages, illustrated, indexed. Lea & Febiger, Philadelphia, Pa. Second ed. 1958. $8.50

The first edition of this text proved useful as a general reference on a wide variety of tropical and subtropical fruit, nut, and stimulant crops. The second edition adds a discussion of the passion fruit and a chapter on the pineapple, although pineapple hardly fits the definition of an orchard crop. The introductory material has been somewhat reduced in the second edition, although even more of it could have been eliminated. This is a small matter, however, as the real value of the book is in the descriptive phases for each crop.

DAVID J. ROGERS

NUCLEAR RADIATION IN FOOD AND AGRICULTURE. Edited by W. Ralph Singleton. 379 pages, illustrated, indexed. D. Van Nostrand Co., Princeton, N. J. 1958. $8.50

The twenty-eight chapters in this book, edited by one of America's outstanding biologists, are based on papers presented at the conference on the Peaceful Uses of Atomic Energy held in Geneva, Switzerland in August 1955.

Important chapters include: the uses of radioisotopes in agriculture; studies on photosynthesis; the absorption of plant nutrients via foliage; the importance of root grafting in the translocation of nutrients and pathogenic organisms in trees; the use of radioisotopes in soil and fertilizer studies; improving crop plants with radiation; cold sterilization of food; and the genetic and biological hazards of nuclear radiation.

Because it is the first important one in its field, this book is a "must" for all college students and teachers of biology. It is much too technical for the layman.

P. P. PIRONE

ATOMIC ENERGY IN AGRICULTURE. William E. Dick. 150 pages, illustrated, indexed. Philosophical Library, New York. 1957 (Printed in Great Britain). $6

This is a condensed version of the papers presented in the book listed just above. It is written by a man who has worked both as a research biologist and as an editor of chemical journals. The author includes considerable background material to make a very readable book. It is a bit more understandable for the less technically trained person than the book above, although it too becomes quite technical at times.

P. P. PIRONE

GENETICS IN SILVICULTURE. C. Syrach Larsen. (Translated by Mark L. Anderson.) 224 pages, illustrated, indexed. Essential Books, Inc., Fair Lawn, N. J. 1956 (Printed in Great Britain.) $5.40

A valuable book, written by the great Danish pioneer in tree breeding, for all persons interested in the improvement of forests. Genetics has a large contribution to make to forestry, and the author has been among the foremost in showing what the new tools of controlled pollination,

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vegetative propagation, seed gardens, cytology, progeny tests and others can do in this direction. This well-written, well-illustrated book calls attention to the distance forestry has traveled from the husbandry and utilization of our tree resources toward becoming a true science.

DAVID D. KECK

RAUWOLFIA: BOTANY, PHARMACOGNOSY, CHEMISTRY AND PHARMACOLOGY. Robert E. Woodson, Jr., Heber W. Youngken, Emil Schlittler and Jurg A. Schneider. Foreword by Arnold J. Lehman. 149 pages, illustrated, indexed. Little, Brown & Co., Boston, Mass. 1957. $5.50

From what the reviewer is led to believe, Ciba Pharmaceutical Products, Inc., one of the most progressive drug firms of modern times, must be credited with the sponsoring of this excellent book. It enlisted students and plant collectors (Father H. Callens from Kisantu, Belgian Congo, is now visiting American botanical institutions on a grant from Ciba), financed their work without stint, and encouraged publication and dissemination of information in a way that several years back would have appeared disadvantageous to the competitive interests of the company, however otherwise it may appear in view of its public-spirited activities. These students and collectors are free to carry on in the present and in the future, utilizing their experience and knowledge for the benefit of society as a whole, and this book is good proof of it.

Quite obviously, the four authors are among the very best in their respective fields. For example, Prof. Youngken, in addition to being a renowned pharmacognosist, has conducted special research on *Rauvolfia;* Dr. Woodson is not only a renowned taxonomist but the chief specialist on the Apocynaceae, the family to which the genus belongs. This thought needs no elaboration, and the reviewer will close with brief remarks on the generic spelling.

Fully aware that he is using "a generic spelling contrary to the International Code of Botanical Nomenclature, in strict compliance with which Linnaeus's original spelling *Rauvolfia* should be maintained" (p. 5 in the book under review), Dr. Woodson feels himself obliged, nevertheless, to perpetuate the "incorrect" spelling "particularly in a publication designed for non-botanical readers." In a strictly botanical work, we suppose, he would comply with the Code. It is then a matter of *"Rauvolfia"* for his botanical associates, but *"Rauwolfia"* for you, readers of The Garden Journal. This is expressly a double standard, not without precedence, and perhaps deserving compliment. On the other hand, would it not have been simpler to follow the Code? Who, if noting it at all, would kick at such a minor orthographic variation? In The Garden Journal in the past, the reviewer spelled the genus *Rauvolfia.* Should you ask why, read Dr. Woodson's clear exposition on the orthographic situation in the chapter on "Botany" and decide the pros and cons for yourself.

JOSEPH MONACHINO

CLIMBING AND TRAILING PLANTS. S. A. Pearce. 142 pages, illustrated, indexed. Transatlantic Arts, Hollywood by the Sea, Florida. 1957. (Printed in Great Britain). $7.25

evaluates over five hundred species and varieties for ornamental uses in the garden. American gardeners will benefit from the skillful descriptions of the plants and cultural instructions carefully prepared by the author who has been at Kew Gardens for twenty years. However, they must be advised that not all the recommendations apply to American conditions, and this statement holds true for the following English publications.

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COLOUR IN THE WINTER GARDEN. Graham Stuart Thomas. 220 pages, illustrated in color and black and white; indexed. Chas. T. Branford Co., Newton Centre, Mass. 1958. (Printed in Great Britain.) $6.50

is a delightful revelation, profusely illustrated with clear line drawings by the author and eight full-page really beautiful water color drawings, of the way the so-called dead season can be brought alive in England. It is written by one who practices horticulture in his own garden and in his well-known Sunningdale Nurseries, and who is also the author of that excellent book THE OLD SHRUB ROSES.

THE MIXED BORDER. Christopher Lloyd. 196 pages, illustrated, indexed. Transatlantic Arts, Hollywood by the Sea, Florida. 1957. (Printed in Great Britain.) $7.25

covers general planning, planting and maintenance. The author has developed on his home property a very fine example of the mixed border which, as he says, "stands midway between two extremes: the shrubbery on the one hand and the herbaceous border on the other," and is a form of gardening suited to the needs of today. It is a well-written book, engaging and penetrating.

GLADIOLI AND DAHLIAS. Charles W. J. Unwin. 128 pages, illustrated, indexed. Transatlantic Arts, Hollywood by the Sea, Florida. Rev. ed. 1956. (Printed in Great Britain.) $2.50

contains factual information on these two favorite garden flowers, useful to home gardener, exhibitor and flower arranger. In this revised edition, the author, notable plant breeder and grower, exhibitor and judge, author and lecturer, has added lists of worthy varieties.

DISEASES OF GARDEN PLANTS. A. Beaumont. 152 pages, illustrated, indexed. Transatlantic Arts, Hollywood by the Sea, Florida. 1956 (Printed in Great Britain.) $6

provides valuable information on the many kinds of diseases that afflict plants, describes symptoms and prescribes remedies. As a plant pathologist, the author has had experience in the control of plant diseases under differing conditions in various parts of England.

MINIATURE ROCK GARDENING IN TROUGHS AND PANS. Royton E. Heath. 127 pages, illustrated, indexed. Transatlantic Arts, Hollywood by the Sea, Florida. 1957. (Printed in Great Britain.) $7.25

will aid the novice and the more advanced amateur gardener in artfully combining rocks and plants as an effective landscape in a confined area—in a stone or concrete sink or trough, in a pan, in a scree frame or "billiard table." Mr. Heath gives detailed instructions on making these containers (with line drawings by F. V. W. Sedgley). He writes knowingly about rock

(Continued on page 183)

NEWS, NOTES and COMMENTS

Henry de la Montagne, who has been a member of the staff of The New York Botanical Garden since 1930, retired September 1, 1958. Mr. de la Montagne served as Assistant Director since 1935 and as Secretary since 1937. A member of the Board of Managers since 1929, he holds the record of the longest period of service of any board member.

Mr. de la Montagne's association with the Garden dates back farther than 1930, however—to 1906 when as a clerk in the Central and South American Telegraph Company which later was known as All America Cables, Inc., and eventually merged with I. T. & T., he carried papers from downtown New York to the Garden for James A. Scrymser. Mr. Scrymser, President of the Central and South American Telegraph Company, was Treasurer of the Garden from 1912 to 1918. It was in the parlor of his home in Gramercy Park that the idea of establishing a botanical garden in New York City was discussed some time during the late 90's—so the late N. L. Britton, first Director of The New York Botanical Garden, told Mr. de la Montagne.

Mr. de la Montagne's association with the Garden's financial matters continued under John L. Merrill, another officer of the Central and South American Telegraph Company, who became Treasurer in 1918 and served until 1937. Mr. de la Montagne himself was elected Assistant Treasurer in January 1919 and held this office for a number of years. He was appointed Manager in January 1929 and Business Manager in June 1932, serving in these capacities until June 1950.

Mr. Montagne served as secretary of the committee appointed by the Board of Managers that activated and saw through to a successful conclusion the Fiftieth Anniversary celebration of the founding of The New York Botanical Garden and the fund raising campaign organized in connection therewith which led to many improvements at the Garden and to the building of the Research-Laboratory.

Reminiscing about the many changes that occurred during his fifty or more odd years with The New York Botanical Garden, Mr. de la Montagne recalled the erection of the fence around the grounds in the mid-thirties as a barrier of through traffic. Traffic to and from Westchester and northern points traversed the center of The New York Botanical Garden creating hazards and resulting in some bad accidents, because the roads were inadequate to handle the number of cars.

Reception for Graduates in the Two-Year Courses in Botany and in Practical Gardening, offered by The New York Botanical Garden, were held in the Assembly Room of the Snuff Mill on Thursday evening, June 19, 1958. T. H. Everett, Curator of Education, welcomed the large gathering of relatives and friends of students and of the Garden, and introduced the speaker, Dr. Harold E. Anthony, who gave a delightful talk on "Plants as a Hobby." Dr. Anthony is Curator Emeritus, Department of Mammals, The American Museum of Natural History.

Mrs. Hermann G. Place, member of the Board of Managers of The New York Botanical Garden, presented certificates for completing the Two-Year-Course in Botany to: France E. Boeri, Edwin Coffey, Helen T. Cunningham, Louis W. den Hartog, Bernard B. Deutsch, Ronald M. Kramer, Harold LaTour, Robert L. Scottino, and for completing the Two-Year Course in Practical Gardening to: Rosalie Assicurato, Mrs. A. Brackman, Mrs. William C. Diederich, William C. Diederich, Veronica Frederick, Margaret R. Kircher, Cynthia B. Madigan, Helen S. Martin, Stephen F. Martin, Mrs. John Henry MacCracken, William J. McKeon, Eleanor Neubert, Robert A. Rothmann, Genevieve W. Senber, Robert Shortway, Jr., Helen Valle, Stephen Valle, Marion Walsh, Benjamin F. Waters, Lillian M. Weber.

Exhibit of Seed Mosaics by Karl Mann will be on display from November 1 to December 1, 1958, in the Museum and Administration Building of The New York Botanical Garden. Mr. Mann, a well-known artist, has developed the idea of using seeds and grains in decorative art. His pictures, which have won awards throughout the country, are in many fine private collections.

International Horticultural Congress. At the recent congress held in Nice, France, Dr. Russell J. Seibert, Director of Longwood Gardens, reported on the American Horticultural Council. It is expected that the Council will play a leading role in the development of an International Society of Horticultural Science, as proposed at the International Horticultural Congress. Permanent headquarters for the International Society were offered by The Netherlands government.

Garden Club of America Awards. Among the awards presented at the annual meeting of the Garden Club of America held in June in York Harbor, Maine, were the Distinguished Service Medal to Miss Harriette R. Halloway of Plainfield, New Jersey, for "The Cornus Arboretum, the Iris and other gardens in Cedar Brook Park, Plainfield, New Jersey;" and the Eloise Payne Luquer Medal, posthumously, to Mrs. George Russell Marriage of the Broadmoor Garden Club of Colorado for her work with alpine plants.

Garden Club of New Jersey Awards. Among the awards presented by the Garden Club of New Jersey at its annual meeting on June 3, 1958, were its gold medal to Mr. and Mrs. Charles W. Holton of Essex Fells for devoted service and to Mrs. William J. Walters of New Brunswick for initiating the idea of a permanent home for the National Council of Garden Clubs, now nearing completion in St. Louis, Missouri, the Certificate of Merit with gold seal to Professor Raymond Korbobo, extension specialist in ornamental horticulture at Rutgers University, for horticultural achievement, to Dr. Harold Moldenke, Director of the Trailside Museum of the Union County Park System for civic achievement, to Miss Cora L. Hartshorn of Short Hills for the wild flowers and bird sanctuary she has given to Millburn Township, and to the Plainfield Garden Club for the iris garden in Cedar Brook Park, directed by Miss Harriette Halloway.

National Chrysanthemum Society will hold its fifteenth annual convention in Portland, Oregon, October 31—November 2, 1958. At the same time the Society will stage a show in the Civic Auditorium; for information write to Mrs. Tom Morris, 12610 N.E. Hassalo Avenue, Portland 16, Oregon.

At the banquet on November 1, Dr. Albert N. Steward, Curator of the Oregon

Henry de la Montagne

State Herbarium, who lived in China for many years, will speak on "Chrysanthemum History and Uses in China." At the breakfast on November 2, Robert Dahl of Seattle, Washington, will discuss "New and Worthy Chrysanthemum Varieties."

Boston Spring Flower Show, due to the expected demolition of Mechanics Hall, will be held in Horticultural Hall and in Symphony Hall, March 10-15, 1959. Symphony Hall is the home of the Boston Symphony Orchestra, a neighbor of the Massachusetts Horticultural Society.

The theme of the show is "A Symphony of Spring." Landscape Architect Harold S. Stevenson is Chairman of the Committee on Exhibitions; members of the Committee are Mrs. William A. Parker, Edward Dane, Dr. John H. Hans and Seth L. Kelsey. Arno H. Nehrling is Director of all the exhibitions of the Massachusetts Horticultural Society.

Course V of the Flower Show Schools, sponsored by the Seventh District of the Federated Garden Clubs of New York State, will be held in Rochester, New York, on September 23, 24, 25, 1958. The instructors are Dr. Robert E. Lee in horticulture, J. S. Ortloff in landscape design, and Mrs. Emily Stuebing in flower arrangement. For information contact Mrs. Henry Blair, Chairman, 1392 Clover Street, Rochester 10, New York.

University of Arizona Faculty Members on Trip to Mexico for Medicinal and Ornamental Plants. Dr. Willis R. Bower, Dean of the College of Pharmacy, Dr. Charles T. Mason, Assistant Professor of Botany and Curator of the Herbarium, and Joseph S. Folkner, Assistant Professor of Horticulture and Assistant Horticulturist in the Arizona Agricultural Experiment Station, have been on an extensive trip down the west coast of Mexico in search of "herbs and simples" used to cure the ills of man and for wild grasses and other plants suitable for landscaping purposes in the dry Southwest. The trip is sponsored by the New Crops Research Branch, Agricultural Research Service of the U.S.D.A.

Cooperating with the University of Arizona are the pharmacognosy divisions of the pharmacy colleges of the College of the Pacific, the University of Utah, and the University of Washington, all interested in specific types of plants with possible medicinal value; and the departments of ornamental horticulture of the University of California at Los Angeles, of the University of California at Davis and of New Mexico A. & M. at Las Cruces, and the regional plant introduction station of Washington State College at Pullman — all interested in plants for landscaping use.

Economic Botanists held a two-day conference at The New York Botanical Garden, August 12 and 13, 1958, to discuss means whereby further uses of plants as food, as medicine, and in industry may be developed. As an outgrowth of the conference Dr. David J. Rogers, Curator of Economic Botany at the Garden, Dr. Quenten Jones of the New Crops Research Branch, U.S.D.A., Beltsville, Maryland, and Dr. P. G. Nickell of Charles Pfizer & Company, Inc., of Brooklyn, N. Y., were appointed a committee to take the necessary steps toward organizing a society of economic botanists.

High Point in Garden Book Sales. At a luncheon in London, England, on July 18, Fleeta Brownell Woodroffe, Garden Editor of Better Homes and Gardens, presented Harry Randall, C. B. E., past president of the British Iris Society and a member of the Royal Horticultural Society, with the one-millionth copy of the BETTER HOMES AND GARDENS GARDEN BOOK. Mr. Randall, who has visited this country, is well known to American gardeners, especially those who are interested in iris and daylilies. He was the first to grow new varieties of American iris and daylilies adapted to English growing conditions. An originator of some fine varieties of iris, Mr. Randall has won the coveted Dykes Medal and other high awards.

"Little Trees for Little Houses." Designed to save home owners costly mistakes, some practical research has been under way at Rutgers Agricultural Experiment Station at New Brunswick, New Jersey, on trees of modest size fitted to the scale of modest-sized homes. Sixty kinds of trees that will grow to a size that will nicely frame and enhance the modern home rather than dwarf its proportions — and at some time in the future necessistate expensive removal—were planted on Rutgers Horticultural Farm No. 1.

Dr. William E. Snyder, Chairman of the Department of Ornamental Horticulture, points out that most of the trees will have a height of twelve to fifteen feet, but none will overpower an eighteen-foot high home. Home owners are invited to visit this planting.

George Sydney Bunting, Jr., was awarded the degree of Doctor of Philosophy by Columbia University on May 29, 1958. In partial fulfillment of the requirements of this degree, he presented a dissertation on "A Revision of the Genus *Spathiphyllum,*" research for which was done at The New York Botanical Garden and while a member of the Garden's 1953-54 expedition to Venezuela. His thesis wil be published in the "Memoirs of The New York Botanical Garden."

Joseph J. Lane, retiring advertising manager of House and Garden, was recently presented with the Tessie K. Scharp Memorial Life Membership Award for outstanding leadership in horticulture by the Horticultural Society of New York. Mr. Lane already holds the Large Gold Medal of the Massachusetts Horticultural Society.

Dr. Robert H. Fife died at his home in Brooklyn, New York, at the age of eighty-six. He was Gebhard Professor of German Languages and Literature and executive officer of the German Department at Columbia University from 1920-1946, and the author or editor of numerous papers on Germanic subjects. One of his latest, "The Revolt of Martin Luther" was published in 1957.

He is survived by his wife, Mrs. Hildegarde E. Wickert.

Under the will of his first wife, Mrs. Sarah Gildersleeve, a legacy of $75,000, the income from which was Dr. Fife's during his lifetime, now comes to The New York Botanical Garden for the benefit of the Library.

Francis Meilland, world famous rosarian, died June 16, 1958 after a long illness at his home in Cap d'Antibes on the French Riviera. His first great rose was 'Golden State' chosen as the official rose of the World's Fair in San Francisco in 1939; it had previously won the "most Beautiful Rose of France" award, the Gold Medal of Bagatelle, and the International Gold Medal at Portland. Rose 'Peace' was one of Meilland's many creations. Three of his roses, 'Pink Peace,' 'Torch Song' and 'Fantam,' will be introduced this fall, while others will be introduced in coming years.

F. L. Arland, member of The New York Botanical Garden since 1938 and a contribuitor to the Journal, died suddenly at his home in Hammondsport, New York on May 3, 1958.

Howard C. Taylor died on August 15, 1958, at the age of 55. He was president and owner of Rosedale Nurseries, Inc., of Hawthorne and Millwood, N. Y., which under his direction since 1930 had earned a national reputation. Mr. Taylor played a prominent part in the affairs of the American Association of Nurserymen, having served it as director, treasurer, vice-president and president. He was also a consultant on nursery practice on the faculties of Cornell University and Long Lsland Agricultural and Technical Institute.

Dr. Percy W. Zimmerman, prominent botanist of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y., died of a heart attack on August 15, in Wenatchee, Washington. Dr. Zimmerman, who was 74 years old, had been in Wenatchee for several weeks representing the Institute in a study of the effects of chemicals on fruit trees.

Dr. Zimmerman began his career in 1916 at the University of Chicago, from which he had received his M.S. and Ph.D. degrees, as an assistant in botany. He was also a member of the faculty of the University of Maryland before joining the staff of the Boyce Thompson Institute in 1925.

In 1936 he was co-winner with Dr. A. E. Hitchcock of the annual award of $1,000 of the American Association for the Advancement of Science; he also received among other awards the Cressy Morrison Prize of the New York Academy of Sciences and the Vaughan Award of the American Society of Horticultural Science. He was the author of PLANT HORMONES and many papers on various phases of plant physiology.

Dr. Zimmerman was an appointive member (by the Torrey Botanical Club) of the Board of Managers of The New York Botanical Garden.

BOOK REVIEWS (from page 181)

and alpine plants for he has studied them in their native habitats, has grown and exhibited them for more than twenty-five years. His book, SHRUBS FOR THE ROCK GARDEN AND ALPINE HOUSE, was well received two years ago.

MODERN COMMERCIAL FRUIT GROWING. T. Wallace and R.G.W. Bush. 384 pages, illustrated, indexed. Transatlantic Arts, Hollywood by the Sea, Florida. 1956. (Printed in Great Britain). $21

This is a new approach to commercial fruit growing and is based on the research conducted at national research stations and by commercial enterprises. The four parts treat of the factors to be considered in

establishing and developing a modern orchard; special problems of tree crops; soft fruits; genetics and breeding; plant growth regulators and virus diseases. Accompanying the text, each chapter of which has been written by an authority on the particular phase, are good illustrations.

PHOTOGRAPHY IN THE GARDEN. T. L. Gunn. 108 pages, illustrated, indexed. Transatlantic Arts, Hollywood by the Sea, Florida. 1956. (Printed in Great Britain.) $6

is adequately presented. This book, which discusses in detail methods of photographing garden scenes and plants outdoors and indoors, and also developing and printing films and plates, is illustrated with photographs and line drawings. Mr. Gunn has been staff photographer of "Amateur Gardening" and "Country Life," so knows whereof he writes.

THE GARDENERS' GOLDEN TREASURY. Edited by A.G.L. Hellyer. 1100 pages, illustrated. Transatlantic Arts, Hollywood by the Sea, Florida. Rev. ed. 1957. (Printed in Great Britain.) $12

brings together in one volume SANDERS ENCYCLOPAEDIA OF GARDENING, THE ENCYCLOPAEDIA OF PLANT PORTRAITS, THE ENCYCLOPAEDIA OF GARDEN WORK AND TERMS. Mr. Hellyer, who has been editor of "Amateur Gardening" since 1946, brought plant names and methods of cultivation up to date in SANDERS ENCYCLOPAEDIA OF GARDENING (it has been revised a number of times since it was first published over half a century ago) compiled the "Plant Portraits" and wrote "Garden Work and Terms."

1001 AFRICAN VIOLET QUESTIONS ANSWERED BY TWELVE EXPERTS. Edited by Helen Van Pelt Wilson. 371 pages, illustrated (drawings by Judith Hirtle); indexed. D. Van Nostrand Co., Princeton, N. J. 1958. $4.95

The questions contained in this book were answered by twelve prominent African violet collectors who live in ten different sections of the country. It is edited by Helen Van Pelt Wilson who is well known for her many gardening books and particularly the ones having to do with African violets.

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MIRIAM LIGHTBOURN
Bernardsville, N. J.

INTRODUCTION TO THE BACTERIA. C. E. Clifton. 558 pages, illustrated, indexed. McGraw-Hill Book Co., New York. 2nd ed. 1958. $7.50

There is a continual need for current textbooks in all fields of science as the pace of research accelerates. In many cases, this need is met by revisions of standard books. The present volume represents such a modernization.

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RICHARD M. KLEIN
Curator of Plant Physiology

THE BOOK OF HERB COOKERY. Irene Botsford Hoffman. 256 pages, indexed. Houghton Mifflin Co., Boston, Mass. Rev. ed. 1958. $3.75

has been popular since its first appearance eighteen years ago. This edition has been brought up to date and expanded to include new recipes and a chapter on how to contrive palatable dishes from ordinary left-overs.

ALSO ADDED TO THE LIBRARY:

Bentley, K. W. THE ALKALOIDS. Interscience Publishers, Inc., New York. 1957. $4.

Smith, Ivor. CHROMATO-GRAPHIC TECHNIQUES. Interscience Publishers, Inc., New York. 1958. (Printed in Great Britain.) $6.75

NOMENCLATURAL EXCURSION (from page 178)

marily by the species that is its type. But many of the entries of conserved names in the *Code* refer to the older method of determining the application of the name.

During the years, also, we have acquired more exact standards for what we consider valid publication of a name. We have learned much that was unknown to the first framers of the *Code* about the exact dates of publication of many botanical works. As a result of stricter criteria and of increased knowledge, we have found many names placed in the list of *nomina conservanda* that did not need to be conserved at all. They can stand without making any exception to the rules.

Another confusing element in the list as it reads today is in the names of species selected for the types. The name of a species is two words: *Rosa rubra,* the name of the genus (*Rosa*), with an added "epithet" (*rubra*). Now the species may be moved, by a taxonomist, from one genus to another. When we search for the *earliest* properly published name of a species, do we use the earliest epithet we can find, no matter with what generic name it occurs; or do we accept the earliest epithet in what we consider the correct genus? When the orchid named by Linnaeus *Cypripedium bulbosum* was separated from the lady's-slippers and placed in a new genus named *Calypso,* it was named *Calypso borealis.* Is this name correct, or should we pick up the "bulbosa" of the old name and call it *Calypso bulbosa?*

These and other difficulties with the list of *nomina conservanda* made a revision of the entire list necessary. This involved verifying every citation of literature, possibly about ten thousand in all; examining every name conserved for the points mentioned above, and others; and bringing the whole into harmony with the current *Code.* Several years ago Dr. Frans Stafleu, of Utrecht (where the *Code* was edited and published), began such a revision. After checking many hundreds of references, he realized that it was too big a job for one man with other things to attend to. At this point I entered the picture. A grant was obtained from the National Science Foundation which enabled me to spend the necessary time abroad.

From May 10 to June 14 I was in Utrecht, working with Stafleu at his headquarters in the University. The Director of the botanical institute there is Dr. Joseph Lanjouw, who is also Rapporteur-Général of the International Congress. We made an excursion to Leiden, where we were hospitably received by Dr. H. J. Lam, Dr. C. G. G. J. van Steenis, Dr. M. A. Donk, Dr. Bakhuizen van den Brink, and other taxonomists, and where we were able to use the library. We spent two days at Haarlem in the fabulous library of the Teyler Stichting. After this concentrated period of work (9:00 a.m. to 6:00 p.m. and often 8:00 to 10:00 p.m., six days a week), we had seen all of the references except those in rare works not to be found in Holland. From June 15 to June 27 I enjoyed a brief holiday, mostly in the north of England. I met Stafleu again in the Botanic Garden at Cambridge, where, with the help of the Director, J. S. L. Gilmour, we worked for two days on sundry rare works. Finally we went to London and spent two weeks at the British Museum (Natural History) in South Kensington, with occasional side trips to the British Museum in Bloomsbury and to the Royal Botanic Gardens at Kew. We enjoyed the cooperation of the staffs of these institutions, especially J. E. Dandy, Keeper of Botany at the British Museum, Miss Edwards, Librarian there, George Taylor, Director of the Royal Botanic Gardens, and C. E. Hubbard, Keeper of the Herbarium at Kew. By the end of our stay in London we had seen all but four or five of the hundreds of works cited in the list of *nomina conservanda* and *rejicienda.*

As a result of all this, a revised list will be issued of *nomina generic conservanda et rejicienda,* probably as a part of the series entitled *Regnum vegetabile,* early in 1959. Meanwhile a proposal is being formulated by A. A. Bullock of Kew to conserve a long list of family names. This leaves us with the burning question of the hour in plant nomenclature: whether or not to conserve specific names. In recent years there has been considerable pressure on taxonomists to do this, exerted by foresters, horticulturists, agronomists, and others who are not themselves taxonomists but who must use plant names frequently. Proposals to this effect have been rejected several times in international botanical congresses. From the brief sketch above of difficulties with generic names, which are *relatively few,* one can easily imagine why botanists have been reluctant to saddle themselves with a like task for specific names. I listened to several energetic discussions on this subject in London. Whether conservation will be authorized or not for specific names will depend on the International Botanical Congress to be held at Montreal in 1959.

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Montgomery Conifer Collection, by Dorothy Ebel Hansell and collaborators. Non-technical descriptions of the conifers comprising the Montgomery Collection in the garden, with information on habitat, history and usage. Illustrated. First edition 1957. 50 cents.

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The Flora of the Unicorn Tapestries, by E. J. Alexander and Carol H. Woodward. 28 pages, illustrated with photographs and drawings; bound with paper. 1941. Second Edition 1947. Third Edition 1950. 25 cents.

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Review of Juniperus chinensis, et al., by P. J. van Melle. A study of the many varieties and forms of *Juniperus* which have been commonly included in the concept of *J. chinensis.* 108 pages, illustrated, bound in paper. 1947. $2.00.

Periodicals

The Garden Journal of The New York Botanical Garden, bimonthly, designed to stimulate interest in the world of plants and the science of plant life, contains non-technical articles on botanical, horticultural and kindred subjects; also special departments — book reviews, questions and answers, news and comments. $2.00 a year. 35c single copy, 45c back numbers. Foreign subscription $2.50 a year.

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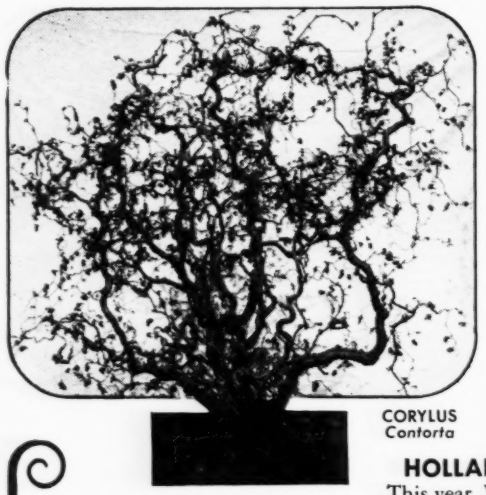

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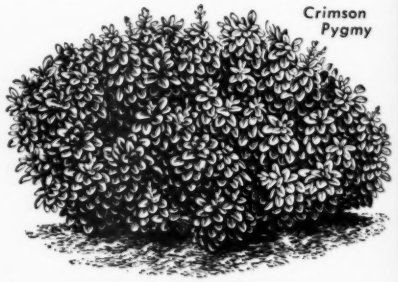

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